Whitenton Group, Inc.
ENVIRONMENTAL CONSULTANTS

Biological Assessment

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas

Prepared for

Enterprise Products Operating, LLC

Prepared by

Whitenton Group, Inc.

June 2012

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ACRONYMS

AHPS	Advanced Hydrologic Prediction Service
BGEPA	Bald and Golden Eagle Protection Act
BACT	Best Available Control Technology
BA	Biological Assessment
CO	Carbon Monoxide
DIB	Deisobutanizer
ESL	Effects Screening Levels
EO	Element of Occurrence
ESA	Endangered Species Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
Frac	Fractionator/Fractionation
GHG	Greenhouse Gas
GPM	Gallons per Minute
H_2S	Hydrogen Sulfide
Pb	Lead
LDAR	Leak Detection and Repair
LAER	Lowest Achievable Emission Rate
LBB	Louisiana Black Bear
MMPA	Marine Mammal Protection Act
MAOI	Maximum Area of Impact
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NCDC	National Climatic Data Center
NLCD	National Land Cover Data
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWS	National Weather Service
NWI	National Wetland Inventory
NGL	Natural Gas Liquids
NRCS	Natural Resources Conservation Service
NSPS	New Source Performance Standards
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NNSR	Nonattainment New Source Review
O_3	Ozone
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RBLC	RACT/BACT/LAER Clearinghouse
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TCEQ	Texas Commission on Environmental Quality
TNDD	Texas Natural Diversity Database

TPWD	Texas Parks and Wildlife Department
TPDES	Texas Pollutant Discharge Elimination System
TDS	Total Dissolved Solids
US	United States
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VOC	Volatile Organic Compound
WGI	Whitenton Group, Inc.

1.0 EXECUTIVE SUMMARY

Enterprise Products Operating LLC (Enterprise) currently operates an oil and gas production facility, known as the Mont Belvieu Complex, in Mont Belvieu, Chambers County, Texas. Enterprise proposes to expand the existing facility and increase the production capacity with the construction of two fractionation (Frac) process units and one deisobutanizer (DIB) unit, immediately adjacent to three existing Frac facilities (two in operation and one under construction). The proposed project is located approximately 0.6 miles north of the intersection of Hatcherville Road and Farm to Market 1942. The project is subject to Prevention of Significant Deterioration (PSD) review for greenhouse gases (GHG) by the United States (US) Environmental Protection Agency (EPA). PSD review is also triggered for carbon monoxide (CO) for the proposed project. A State National Ambient Air Quality Standards (NAAQS) analysis is required for nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particulate matter (PM_{10}, and $PM_{2.5}$. The proposed emissions of SO_2 and hydrogen sulfide (H_2S) are also subject to review under 30 TAC Chapter 112. Speciated volatile organic compounds (VOC) compounds require a health effects evaluation and comparison to the Texas Commission on Environmental Quality (TCEQ) Effects Screening Levels (ESL). The TCEQ is responsible for review of the State NAAQS analysis, 30 TAC Chapter 112 analysis, and health effects evaluation and comparison to ESLs.

This Biological Assessment (BA) is a complete evaluation of the potential environmental impacts the proposed project may have on federally-protected species and/or their potential habitat. Protected species evaluated in this document include threatened, endangered, and candidate species, migratory birds, bald and golden eagles, and marine mammals. This BA includes a field survey and an evaluation of potential environmental impacts based on air quality modeling results, construction information, and National Pollutant Discharge Elimination System (NPDES) information provided by Enterprise and RPS, Enterprise's air quality permitting consultant for the project.

Construction of the proposed two new Frac units and DIB unit will take place within the existing facility in an area approximately 20 acres in size. No additional earth disturbance will be required outside of this 20-acre area. The proposed project location has historically been disturbed. The northwest corner of the project area is maintained pastureland. The northeast corner is an active flare stack and adjacent pit. The remainder of the project area is currently being utilized as a staging area for the construction of Fractionator VI. The staging area consists of road base, temporary buildings, vehicles, and equipment. No vegetation was observed in the

staging area. No new outfall structures will be required for this project. The project will utilize existing staging areas for construction.

Federally-protected species considered in this BA include the piping plover, Sprague's pipit, smalltooth sawfish, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, Louisiana black bear, red wolf, bald and golden eagles, migratory birds, and marine mammals. The field surveys included a pedestrian protected species habitat evaluation of the proposed project area and the portions of the surrounding facility that are not restricted by stringent safety requirements, a windshield habitat evaluation of all publicly-accessible habitats within a 3-mile radius of the project area, an aerial habitat evaluation of all areas within a 3-mile radius. Data were collected to describe resident vegetation communities and assess the potential for occurrence of protected species. Six habitat types were observed in the areas surrounding the Mont Belvieu Complex: wetland, pastureland, mixed woodland, open water, riverine, and canals.

RPS performed dispersion modeling of air pollutants that will be emitted by the proposed project in accordance with the PSD Permit requirements. All of the predicted concentrations due to the project are less than the Significant Impact Levels (SIL) designated by the EPA and TCEQ for each pollutant and averaging period; therefore, the project emissions will not cause or contribute to an exceedance of any applicable NAAQS.

The action area for the project is a circle that encompasses the Mont Belvieu Complex, the proposed project construction area, and the wastewater outfall location. The action area has a maximum radius of approximately 0.5 mile. Five low quality habitat types were observed within the action area: pastureland, woodland, wetland, open water, and canal. Migratory birds have the potential to utilize these habitat types. No additional federally-protected species are likely to utilize the action area.

The maximum predicted concentrations of all modeled pollutants is well below the respective TCEQ ESLs and also well below the first screening level of 10% of the ESLs. Accordingly, no adverse welfare impacts are expected to occur within the action area as the result of the additional emissions of these pollutants.

The construction of the proposed project will have no direct or indirect impact on federally-protected species habitat. Enterprise will utilize the best available control technology (BACT) to control emissions and thus minimize impacts to the surrounding environment to the maximum

extent practicable. The controls proposed for each pollutant are consistent with both the TCEQ BACT guidance and the most stringent limits in the RACT/BACT/LAER Clearinghouse (RBLC).

Based on the background research described in Section 8.1 and the determinations described in Section 8.2.3, the proposed project will likely have no direct or indirect impact on federally-protected species habitat.

Based on the information gathered for this BA, Whitenton Group, Inc. (WGI) biologists recommend that a finding of no effect be accepted for all ten federally-protected species. The take of migratory birds, bald or golden eagles, or marine mammals is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act described below in Sections 3.3 - 3.5, respectively.

2.0 INTRODUCTION

Enterprise currently operates an oil and gas production facility , known as the Mont Belvieu Complex, in Mont Belvieu, Chambers County, Texas. The Mont Belvieu Complex is a key hub of the domestic and international natural gas liquids (NGL) industry with a gross capacity of 380 MBPD and growing. This facility receives NGLs from several major supply basins in North America, including the Mid-Continent, Permian Basin, San Juan Basin, Rocky Mountains, East Texas, and the Gulf Coast[1]. Enterprise proposes to expand the existing Mont Belvieu Complex by adding two new Frac process units and one DIB unit immediately adjacent to the three existing Frac facilities (two in operation and one under construction). These five Frac facilities will be located within the North Plant of the Mont Belvieu Complex. The new Frac and DIB units will help accommodate NGL volumes from the Eagle Ford Shale basin, as well as other producing areas.

PSD review is triggered for CO for the proposed project. A State NAAQS analysis is also required for NO_2, SO_2, PM_{10}, and $PM_{2.5}$. The proposed emissions of SO_2 and H_2S are also subject to review under 30 TAC Chapter 112. Speciated VOC compounds require a health effects evaluation and comparison to the TCEQ ESLs.

This BA is a complete evaluation of the potential environmental impacts the proposed project may have on federally-protected species and/or their potential habitat. Protected species evaluated in this document include threatened, endangered, and candidate species, migratory birds, bald and golden eagles, and marine mammals. Federal agency regulations for protected species evaluated in this BA are described in Section 3.0.

The purpose of this BA is to research, evaluate, analyze, and document the potential for direct and indirect effects, interdependent and interrelated actions, and cumulative effects on federally-protected species as a result of the proposed project. This BA includes a pedestrian protected species habitat evaluation of the proposed construction area, a windshield and aerial assessment of all publicly-accessible habitats in the surrounding areas, and an evaluation of potential environmental impacts based on air quality modeling results, construction information, operation information, and NPDES information provided by Enterprise and RPS.

The conclusion of this BA will include a recommended determination of effect on federally-protected species and their habitat. Three possible determinations offered by the US Fish and Wildlife Service (USFWS) for the purpose of Biological Assessments and Evaluations are described (verbatim) below[2].

1. No effect – A "no effect" determination means that there are absolutely no effects from the proposed action, positive or negative, to listed species. A "no effect" determination does not include effects that are insignificant (small in size), discountable (extremely unlikely to occur), or beneficial. "No effect" determinations do not require written concurrence from the Service unless the National Environmental Policy Act analysis is an Environmental Impact Statement. However, the Service may request copies of no effect assessments for our files.

2. May affect, not likely to adversely affect – A "may affect, not likely to adversely affect" determination may be reached for a proposed action where all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat (i.e., there cannot be a "balancing," where the benefits of the proposed action would be expected to outweigh the adverse effects – see below). Insignificant effects relate to the size of the effects and should not reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. This conclusion is usually reached through the informal consultation process, and written concurrence from the Service exempts the proposed action from formal consultation. The federal action agency's written request for Service concurrence should accompany the biological assessment/biological evaluation.

Note: A conclusion or finding of "may affect, but is not likely to adversely affect" by an action agency and the USFWS, consultation with the USFWS is considered complete. This is known as "informal consultation".

3. May affect, likely to adversely affect - A "may affect, likely to adversely affect" determination means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect" even if the net effect is neutral or positive. Section 7 of the Endangered Species Act require that the federal action agency request initiation of formal consultation with the Service when a "may affect, likely to adversely affect" determination is made. A written request for formal consultation should accompany the biological assessment/biological evaluation.

   Note: A conclusion or finding of "may affect, likely to adversely affect" by an action agency and the USFWS; or if USFWS does not concur with an action agency's finding of "not likely to adversely affect" determination, then "formal consultation" is required between the action agency and the USFWS. Formal consultation results in the USFWS issuing a biological opinion as to whether or not the action, as proposed, will jeopardize the continued existence of any listed species.

3.0 AGENCY REGULATIONS

3.1 REGULATIONS AND STANDARDS

The Clean Air Act requires air quality standards be maintained to protect public health and the environment. These standards are the NAAQS and are regulated by the US EPA and the TCEQ. Ambient air is the air to which the general public has access, as opposed to air within the boundaries of an industrial facility. The NAAQS are concentration limits of pollutants in ambient air within specific averaging time. The averaging time is the time period over which the air pollutant concentrations must be met to comply with the NAAQS. The NAAQS are classified into two categories: primary and secondary standards. Primary standards are set to protect public health, including "sensitive" populations. Secondary standards are set to protect public welfare, including the environment[3].

The EPA sets NAAQS for six principal air pollutants, also referred to as criteria air pollutants. These six criteria air pollutants are NO_2, ozone (O_3), SO_2, PM, CO, and lead (Pb)[3]. A geographic area whose ambient air concentration for a criteria pollutant is equal to or less than the primary standard is an attainment area. A geographic area with an ambient air concentration greater

than the primary standard is a nonattainment area. A geographic area will have a separate designation for each criteria pollutant[4].

The Clean Air Act also requires the EPA to establish regulations to prevent significant deterioration of air quality in attainment areas. The EPA established PSD Increments to satisfy this requirement. A PSD Increment is a measure of the maximum allowable increase in ambient air concentrations of a criteria pollutant from a baseline concentration after a specified baseline date. An SIL is a concentration that represents a de minimis, or insignificant, threshold applied to PSD permit applicants. The SIL is a measurable limit above which a source may cause or contribute to a violation of a PSD Increment for a criteria pollutant[5]. Before a PSD permit can be issued, the applicant must demonstrate that the proposed emissions from a project will not cause or contribute to a violation of a NAAQS or to an increase above a PSD Increment for each pollutant emitted in significant amounts by the project[6].

The air quality analysis to demonstrate compliance with NAAQS and PSD Increments is performed using computer models to simulate the dispersion of the emitted pollutants into the atmosphere and predict ground level concentrations at specified receptor locations in the area around the source of emissions. If the modeled concentration for a given pollutant and averaging period is less than the EPA-specified SIL, the project is determined to have no significant impact on ambient air quality and no further analysis is required for that pollutant and averaging period. If the SIL is predicted by the model to be exceeded for a given pollutant, further modeling of the project emissions combined with existing emission sources in the area is required to estimate total ambient concentrations. The modeling must demonstrate that the total concentration, including an appropriate background, does not exceed the applicable NAAQS and PSD Increment.

3.2 ENDANGERED SPECIES ACT

The USFWS and the National Oceanic and Atmospheric Administration - National Marine Fisheries Service (NOAA-NMFS) regulate the Endangered Species Act (ESA) of 1973. "The purpose of the ESA is to protect and recover imperiled species and the ecosystems on which they depend." Imperiled species specifically includes those listed by the USFWS as threatened or endangered[7]. Candidate species are those "the FWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities[8]." Candidate species are not specifically protected by the ESA, but will be included for the purposes of this BA.

Section 9 of the ESA prohibits the "take" of threatened and endangered species. "Take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering[9]."

3.3 MIGRATORY BIRD TREATY ACT

All migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918, which is regulated in the US by the USFWS. The MBTA prohibits the following: "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird[10]".

"A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle." According to the USFWS, there are approximately 836 bird species protected by the MBTA[10].

3.4 BALD AND GOLDEN EAGLE PROTECTION ACT

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, which is regulated by the USFWS. The BGEPA prohibits the following: ''take, possess, sell, purchase, barter, offer to sell, purchase, or barter, transport, export or import, at any time or any manner, any Bald Eagle (or Golden Eagle), alive or dead, or any part, nest, or egg thereof.'' "Take" is defined as ''pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb.'' ''Disturb'' is defined as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior[11].''

3.5 MARINE MAMMAL PROTECTION ACT

The USFWS and NOAA-NMFS regulate the Marine Mammal Protection Act (MMPA) of 1972. The MMPA prohibits the "take" of marine mammals in US waters or by US Citizens outside US waters and the importation of marine mammals or marine mammal products into the US. "Take" is defined as "hunt, harass, capture, or kill." [12]

4.0 PROJECT DESCRIPTION

4.1 PROJECT PURPOSE AND LOCATION

The purpose of the project is to expand the existing Enterprise Mont Belvieu Complex by adding two new Frac units and one DIB unit immediately adjacent to the three existing Frac units (two in operation and one under construction). These five Frac units will be located within the North Plant of the Mont Belvieu Complex.

The two new Frac units will be used to separate a NGL feed into separate ethane, propane, butane, and gasoline fractions. The DIB unit will be used to separate isobutane and normal butane from mixed butane streams. Simplified process flow diagrams for the Frac and DIB units are provided in Figures 4-1 and 4-2 (Appendix A). The additional Frac and DIB units are necessary to process the NGL currently being produced out of the Eagle Ford Shale, as well as other producing areas.

The proposed project is located approximately 0.6 miles north of the intersection of Hatcherville Road and Farm to Market 1942 (Figure 1 - Appendix B).

Project location information:

USGS Quad	Latitude/Longitude
Sheeks Mont Belvieu	29.865620 -94.915959

4.2 CONSTRUCTION INFORMATION

4.2.1 CONSTRUCTION DESCRIPTION

Construction of the proposed two new Frac units, one DIB unit will take place within the existing facility in an area approximately 20 acres in size. No additional earth disturbance will be required outside of this 20-acre area. The proposed project location has historically been disturbed. The northwest corner of the project area is maintained pastureland. The northeast corner is an active flare stack and adjacent pit. The remainder of the project area is currently being utilized as a staging area for the construction of Frac VI. The staging area consists of road base, temporary buildings, vehicles, and equipment. No vegetation was observed in the staging area. The proposed construction activities include the installation of approximately 66 steel-reinforced concrete piles, 414 drill shafts, and 5 acres of concrete paving (facility and access road). No new outfall structures will be required for this project. The project will utilize existing staging areas for construction. The construction area is shown on Figure 2 and 3 (Appendix B).

The new facilities will include:

- Two Frac Unit deethanizer distillation columns
- Two Frac Unit depropanizer distillation columns
- Two Frac Unit debutanizer distillation columns
- Two natural gas fired hot oil heaters
- Two natural gas fired regenerant gas heaters
- Cooling towers
- New flare to treat process vents from the Frac and DIB units
- Ancillary tanks
- One DIB distillation column
- New DIB unit's contribution to the flare

The projected construction start date (pending necessary permit approvals) is 01 November 2012. The projected operation start date is 01 November 2013.

4.2.2 CONSTRUCTION ACTIVITIES AND SCHEDULE

The total time estimated to complete the construction of the project is approximately 79 weeks and includes the following list of general construction activities. The construction schedule will

be 12 hours a day, seven days a week until completion. The schedule may increase, as needed, to meet the project deadline.

- site work
- install piles
- pour concrete
- erect structural steel
- install equipment
- install piping and tie-ins
- install instruments & electrical
- install insulation
- paint

The estimated number of personnel required for construction of the Frac units is 400 for a maximum timeframe of 79 weeks. Any emissions resulting from the additional construction personnel would be insignificant and temporary.

4.2.3 CONSTRUCTION EQUIPMENT REQUIRED

Equipment required to complete the proposed facilities construction activities and their estimated schedule is listed below.

Construction Equipment	Number of Units	Number of Weeks
15 Ton Hydraulic Crane	1-18	60
35 Ton Hydraulic Crane	1	36
40 Ton Hydraulic Crane	1	36
65 Ton Hydraulic Crane	1-4	40
70 Ton Hydraulic Crane	1-4	52
80 Ton Hydraulic Crane	1	44
100 Ton Crawler Crane	1	44
230 Ton Crawler Crane	1-4	13
275 Ton Crawler Crane	1	32
2250 Crawler Crane	1	32
40 Foot Knuckle Boom Lift	1-4	52
40 Foot Manlift Straight Boom	1-4	52
60 Foot Knuckle Boom	2	32
60 Foot Manlift Straight Boom	1-8	52
80 Foot Knuckle Boom	1-8	48
120 Foot Manlift	2	12

Construction Equipment	Number of Units	Number of Weeks
17-21 Foot Scissor Lift	2	32
22-25 Foot Scissor Lift	1-6	52
26-31 Foot Scissor Lift	1-12	48
5000 Pound Warehouse Forklift	1-2	60
6000 Pound Rough Terrain Forklift	1-2	60
9000 Pound Extend-a-Boom Forklift	1-8	60
Diesel Welder	1-40	60
Electric Welder-4 Pack	1-4	48
Electric Welder-8 Pack	4-8	28
Fusion Machine	2	16
Backhoe/Loader	1-4	60
Backhoe/Loader with Breaker	1-2	32
Excavator, Mini	2-4	40
Excavator, Medium Duty	1-2	40
Excavator, Medium Duty, with Hyd. Breaker	1	16
Excavator, Heavy Duty	1-9	44
Dozer, 80 HP	1-2	60
Dozer, 90 HP	1-3	48
Skid Steer Loader with Tracks	1-4	52
Wheel Loader	1-5	60
Roller, Rammex	1-4	52
Roller, 66 Inch Smooth Drum	1-3	56
Roller, 84 Inch Smooth Drum	1	24
Roller, 46 Inch Padded Drum	1-2	28
Motor Grader	1-2	40
185 CFM Diesel	1-8	60
375 CFM Diesel	1-4	40
1600 CFM Air Dryer	2	16
Portable Generator	1-16	60

4.2.4 CONSTRUCTION NOISE LEVELS

The construction contractor implements a Hearing Protection Procedure to protect employees and the surrounding environment from noise pollution to the maximum extent practical. Risk assessments are performed during the planning stages of construction to identify activities where high and prolonged noise levels can be expected and minimized.

The contractor will consider, when feasible and possible, alternative work methods, which lessen or eliminate the use of noisy equipment. The equipment utilized is well maintained and chosen based on low noise output. Sound attenuation equipment is fitted and in good working order. Construction activities are positioned and arranged at reasonable distances from noise-producing plant activities. When a number of machines are in use, arrangement of these machines is strategically staged or grouped with barriers and absorbent material.

When exposure to noise cannot be prevented, the construction contractor will institute a noise monitoring program.

Few pieces of equipment required for construction have the potential to exceed 85 decibels at 50 feet from the source (crane derrick, jack hammer, paver, pile driver, rail saw, rock drill, and scraper). The best available technology will be used to maintain noise levels during construction below 85 decibels measured at a distance of 50 feet from the source as much as practical.

4.3 OPERATION AND MAINTENANCE INFORMATION

4.3.1 OPERATION DESCRIPTION

Two new Frac units and one DIB unit will be constructed immediately adjacent to the three existing Frac units (two in operation and one under construction). These five Frac units will be located within the North Plant of the Mont Belvieu Complex.

The two new Frac units will separate NGL feed into separate ethane, propane, butane, and gasoline fractions. The DIB unit will separate isobutane and normal butane from mixed butane streams[13].

The maximum operating schedule is 24 hours a day, 7 days a week, and 52 weeks a year[13].

No new personnel will be required for operation.

Maintenance activities include preventative and routine maintenance on critical mechanical, electrical, and air pollution control systems. Maintenance activities include, but are not limited to, Leak Detection and Repair (LDAR) on fugitive components, daily walk throughs, routine tank inspections, and infrequent complete unit turnarounds completed once every 10-15 years. Any and all emissions generated from maintenance activities are included in the air permit amendment application, or will otherwise be permitted or reported. No additional

environmental impacts are anticipated as a result of maintenance activities required for the Frac and DIB units[13].

4.3.2 WATER USE

The Mont Belvieu Complex purchases water from the City of Houston and the City of Mont Belvieu. The facility also has its own ground water well. Based on the 2011 Industrial Water Use Survey submitted to the Texas Water Development Board, the total water consumption averaged 1765 gallons per minute (gpm). The design basis for each Frac unit is 370 gpm, primarily for cooling water. The total water demand for the two additional Frac units will be 740 gpm. That represents a 42% increase in water use for the entire facility.

4.3.3 WASTEWATER

The new Frac units will be located within the North Plant of the Mont Belvieu Complex. The North Plant currently discharges wastewater and stormwater under Texas Pollutant Discharge Elimination System (TPDES) Permit Number 03499. The process wastewater from the new Fracs will be combined with that from other Frac units in the North Plant and will be treated in the North Plant's existing wastewater treatment system. The non-process wastewater (i.e., cooling water) will be discharged with only pH adjustment (no biological treatment). The non-process wastewater will be routed to the North Plant Outfall 001, which discharges into the Hatcherville Road Ditch and ultimately into Cedar Bayou.

The new Frac units are expected to generate a combined flow of 146.4 gpm, which includes process wastewater (30 gpm), first flush storm water from process units (3.4 gpm), and non-process utility flows (113 gpm). The existing North Plant Outfall 001 receives an estimated 367 gpm. The new Frac units combined represent a flow increase of approximately 40%. No changes to the wastewater discharge (i.e., temperature change, pH change, pollutant concentration, etc.) other than an increase in flow rate are anticipated.

At the request of the TCEQ, Enterprise will submit a revised TPDES amendment application for the South Plant permit (Number 02940), which will consolidate the North Plant and the South Plant into one TPDES permit and terminate TPDES Permit Number 03499. The outfalls at the North Plant will be added to the combined TPDES permit. The North Plant Outfall 001 will become Outfall 004 in the consolidated permit.

The first flush storm water from process area sumps will be routed to the wastewater treatment system. Excess storm water from the sumps and from other paved areas will be routed to two retention ponds that will be constructed. The ponds will be used for sedimentation and oil retention, if needed. A new stormwater outfall will be permitted to authorize the discharge from the new ponds.

Best Management Practices will be utilized in accordance with Section 401 of the Clean Water Act and Chapter 279 of the Texas Water Code. If the project falls within the criteria for the TCEQ General Permit for Storm Water Discharges Associated with Construction Activities, a Stormwater Pollution Prevention Plan will be prepared. The facility has a Spill Prevention, Control, and Countermeasure Plan for the storage of oil and oil products.

4.3.4 OPERATION NOISE LEVELS

Project engineers estimate that noise levels during operation should be comparable to noise levels from maintenance activities that currently take place at the plant.

4.3.5 EMISSION CONTROLS

Per 30 TAC §116.111(a)(2)(c), new or modified facilities must utilize BACT, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility. The new and modified facilities associated with the project are four heaters, four cooling towers, process fugitives, flare (contribution from new Fracs and DIB), and six tanks[13].

4.3.5.1 NO_x

Nitrogen oxides (NO_x) emissions from natural gas-fired combustion sources, including heaters, result from either the combination of elemental nitrogen with oxygen in the combustion air within the combustion device (thermal NO_x) or from the oxidation of organically-bound nitrogen contained in the fuel (fuel NO_x). Natural gas, which will be used as fuel for the proposed Hot Oil Heaters and Regenerant Heaters, does not contain significant amounts of organic nitrogen; therefore, most of the NO_x emission are considered thermal NO_x[13].

NO_x emissions from the flare are the result of thermal NO_x formation due to elemental nitrogen in the air. The flared gas streams will not contain any significant nitrogen compounds other than elemental nitrogen; therefore, no "fuel NO_x" will be produced. NO_x emissions will be minimized primarily by minimizing the amount of flaring to the extent possible[13].

BACT guidance on the TCEQ website at the time of preparation of the permit application states that BACT for NO_x from process furnaces and heaters less than 300 MMBtu/hr is burners with the best available NO_x performance for the given burner application. Enterprise proposes to use ultra-low NO_x burners that will limit annual average NO_x emissions to less than or equal to 0.025 lb/MMBtu on both the Hot Oil Heaters (140 MMBtu/hr each) and the Regenerant Heaters (28.5 MMBtu/hr each). This level of NO_x emissions is the lowest emission rate that heater vendors have indicated that they can meet with burners used for this configuration and therefore meets TCEQ's BACT guidelines[13].

4.3.5.2 CO and VOC

CO and VOC emissions from gas-fired heaters are the result of incomplete fuel combustion caused by conditions such as low temperature, insufficient residence time, or insufficient oxygen in the residence zone. Proper fuel-to-air ratio and a design that provides the necessary residence time, temperature, and turbulence within the combustion zone ensure good combustion to minimize the emission of CO and VOC[13].

With proper combustion technology and design, generation of CO is minimized by maintaining good combustion efficiency in a gas-fired heater. Combustion efficiency in heaters is a function of both design and operation. Proper fuel-to-air ratio and a design that provides the necessary residence time, temperature, and turbulence within the combustion zone ensure good combustion. BACT guidance on the TCEQ website at the time of preparation of the permit application states that BACT for CO from Hot Oil Heaters and Regenerant Heaters is an exhaust concentration of 50 ppmvd at 3% oxygen, which is equivalent to about 0.035 lb/MMBtu[13].

Good combustion practices and design are the only control methods identified in the RBLC database for CO control. The RBLC emission limit will be met on an annual average basis[13].

CO will be the primary pollutant emitted by the flare as CO is produced from incomplete combustion of carbon compounds. Enterprise proposes to minimize CO emissions through the use of a well-designed elevated flare capable of achieving a high VOC destruction efficiency that will also ensure that CO production is minimized. The RBLC database search results indicate no control strategies for minimizing CO from flares other than proper flare design and operation in accordance with Section 60.18 of Subpart A of New Source Performnce Standards (NSPS) (Section 4.2.3.4) [13].

Enterprise will maintain the flame integrity through the implementation of good combustion practices and flame detection monitoring with an automatic re-ignition. Since the combustion efficiency (i.e., destruction/removal efficiency) of a flare is primarily influenced by temperature, residence time, and the mixing of air and process gases in the combustion zone, implementation of these design considerations and use of a natural gas/syngas-fired pilot flame will support a flare design that maximizes efficiency and minimizes incomplete combustion. These design requirements satisfy BACT[13].

The proposed project is subject to NNSR for VOC; therefore, VOC emissions from the heaters and flare must meet Lowest Achievable Emission Rate (LAER) requirements. TCEQ does not specify a BACT/LAER guideline for VOC emissions from gas-fired heaters or flares. The RBLC data indicates that no VOC control strategies other than proper design and good combustion practices have been applied to gas-fired heaters or flares. Reported and calculated emission rates range from 0.0004 lb/MMBtu to 0.011 lb/MMBtu. Given the low level of emissions, further control is not warranted or available; and, efficient combustion is proposed as LAER to meet an emission limit equivalent to 0.002 lb/MMBtu for the proposed heaters. VOC emissions will also be minimized by minimizing the amount of flaring to the extent possible[13].

4.3.5.3 PM/PM_{10}/$PM_{2.5}$

Emissions of PM, which includes particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$), from gas-fired heaters result from inert solids in the fuel and combustion air and from unburned fuel hydrocarbons that agglomerate to form particles that are emitted in the exhaust. PM/PM_{10}/$PM_{2.5}$ emissions from gas-fired heaters are inherently low because they achieve high combustion efficiencies and usually burn clean fuels[13].

TCEQ does not specify a BACT guideline for PM emissions from gas-fired heaters. The RBLC data indicates that no PM/PM_{10}/$PM_{2.5}$ control strategies other than good combustion and use of clean fuels have been applied to gas-fired heaters. Reported and calculated emission rates range from 0.0009 lb/MMBtu to 0.013 lb/MMBtu. Given the low level of emissions, further control is not warranted or available for gaseous fuel combustion, and efficient combustion of clean fuel is proposed as BACT to meet an emission limit equivalent to 0.004 lb/MMBtu[13].

The proposed cooling towers are sources of PM/PM_{10}/$PM_{2.5}$ from drift sources. For facilities for which drift loss rates were reported, the rates ranged from 0.0005% to 0.008%. The PM control for all towers was listed as either drift/mist eliminators or no control was listed. No other control technologies were identified[13].

Total dissolved solids (TDS) in the circulating water also determine the amount of particulate emissions in the drift. Therefore, limiting the TDS concentration is also considered to be a potentially viable control option. Drift eliminators with a design efficiency of 0.001% of the circulating water will be used on both cooling towers. This technology and the design efficiency are among the most efficient identified in the RBLC and available from vendors. The TDS in the cooling towers will also be maintained at or below about 3,500 ppmw to further minimize emissions. This TDS level and the design drift lost from the main cooling tower will be equal to the lowest rates found in the RBLC database, and therefore represents BACT[13].

4.3.5.4 SO_2

Emissions of SO_2 from the heaters will be controlled by burning natural gas with minimal sulfur content. Given the low level of SO_2 emissions, further control is not warranted, and use of clean gaseous fuels is proposed as BACT [13].

The flare converts sulfur compounds in the waste gas streams to SO_2; therefore, proper operation of the flare inherently results in SO_2 emissions due to the intended destruction of the reduced sulfur compounds. This destruction efficiency will be met by operating the flare in accordance with the specifications for flares in NSPS, Subpart A, 60.18. These design and operating methods satisfy BACT for SO_2[13].

5.0 BACKGROUND INFORMATION

5.1 GENERAL ENVIRONMENTAL INFORMATION

This section provides applicable environmental characteristics for the general region in which the project is located.

5.1.1 GENERAL REGION INFORMATION

The proposed construction site is located within the Western Gulf Coastal Plain eco-region of Texas[14] which is in the Gulf Coastal Plain physiographic province of North America[15]. The area in which the project is located is typical for the Western Gulf Coastal Plain eco-region.

This region borders the Gulf Coast within the state of Texas. The Gulf Coast influence creates multiple dynamic ecosystems within this ecoregion including bays, estuaries, salt marshes, and

tidal flats. These ecosystems are home to an abundance and variety of wildlife including mammals, birds, reptiles, amphibians, fish, and invertebrates. This region is prime nesting and wintering grounds for migratory birds. The bays and estuaries provide Essential Fish Habitat for several federally managed marine fish species [16, 17].

The majority of the river basins of Texas drain towards the Gulf of Mexico. This ecoregion also receives more rainfall than many other ecoregions in Texas. As a result, this region is ecologically diverse inland as well as immediately adjacent to the coastline. Freshwater wetlands, marshes, and swamps as well as hardwood bottomlands, prairies, and oak mottes are common throughout this region[18].

The Gulf Coast Prairies and Marshes eco-region spans the Texas. Because of the abundant water resources, the rich soils, and the proximity to the coast, this area is commonly converted to cropland, ranchland, and industrial development[17]. These land uses have reduced and fragmented the critical protected species habitat throughout the region.

The proposed project is located in Chambers County, which is the second eastern-most coastal county in Texas.

5.1.2 LAND USE

Most of the native coastal prairie is now planted pastureland for beef cattle grazing or cropland for rice, sugarcane, forage, and grain crops[17]. Other land uses throughout Chambers County include residential, urban, commercial, and other agricultural development[18].

Based on the background review, the land use within the proposed project area is currently industrial development. Land use types within the surrounding areas include agricultural, residential, and industrial development.

5.1.3 CLIMATE

Mean daily temperatures in nearby Baytown, Texas, range from approximately 52°F in January with an average daily minimum of 42°F to 84°F in July with an average daily maximum of 92°F. Prevailing winds are typically out of the southeast with an average speed of 10-15 miles per hour. Average annual precipitation is 54 inches. The mean annual growing season is 261 days. The average relative humidity in the afternoon is about 64 percent, increasing overnight[18].

At the time of the field survey, the US Drought Monitor[19] indicated the survey area does not currently have drought conditions. According to the National Weather Service/Advanced Hydrologic Prediction Service (NWS/AHPS), the area has received approximately 2 – 4 inches of rain within the 30 days prior to the field survey and has had normal rainfall for the previous 90 days[20].

The NOAA – National Climatic Data Center (NCDC) Standardized Precipitation Index[21] reported results for Chambers County, east Texas (the river basins that contribute to the water resources in Chambers County and surrounding areas), and the State of Texas are shown in Table 1 below.

Table 1. Standardized Precipitation Index Summary[21]

Year	Chambers County	East Texas	Texas
2005	moderately dry	moderately dry to exceptionally dry	near normal to exceptionally dry
2006	extremely moist	mid-range to very moist	moderately dry to very moist
2007	moderately moist	moderately moist to extremely moist	moderately moist to extremely moist
2008	near normal	near normal to moderately dry	near normal to extremely dry
2009	near normal	near normal to abnormally moist	near normal to abnormally moist
2010	near normal	near normal to extremely dry	extremely dry to moderately moist
2011	severely dry	severely dry to exceptionally dry	severely dry to exceptionally dry

The NOAA – NCDC Standardized Precipitation Index indicates that, while Chambers County has been impacted by drought only two of the past seven years, the majority of Texas has been impacted by significant drought conditions for five out of the past seven years. The river basins that contribute to the water resources in Chambers County in east Texas have been impacted by significant drought for four out of the past seven years. Long-term drought conditions have weakened many ecosystems across Texas. While the coastline has not experienced as severe a deficiency in direct precipitation as have other areas of Texas, it is directly affected by the limited influx of freshwater from Texas' river basins[21].

5.1.4 TOPOGRAPHY

Chambers County has low and flat terrain, with elevations ranging from sea level to approximately 50 feet[18]. The topography of the project area is flat with an approximate elevation of 40 feet above sea level[22] (Figure 4 – Appendix B).

According to the Federal Emergency Management Agency (FEMA) flood insurance rate map, the proposed project site is not located within the designated 100-year floodplain. Portions of the surrounding areas are located within the designated 100-year floodplain. FEMA floodplain designation is demonstrated in Figure 5 (Appendix B)[23].

5.1.5 GEOLOGY

The specific geologic formation found in the area is the Beaumont Formation from the Cenozoic Era[24].

The geologic units found within and surrounding the proposed project area are listed and described below in Table 2.

Table 2. Geologic Units Summary[25]

Map Unit	Unit Name and Description	Rock Types
Qbc	Beaumont Formation, areas predominantly clay	clay, mud, or silt
Qbs	Beaumont Formation, areas predominantly sand	sand, silt, clay, mud, or gravel
Water	water	water

5.1.6 SOILS

Dominant soils found in Chambers County include: coastal clays and sandy loams[18].

The Natural Resource Conservation Service (NRCS) soil units mapped within and surrounding the proposed project area are listed and described below in Table 3.

Table 3. NRCS Soil Units Summary[26]

NRCS Map Unit Symbol	NRCS Map Unit Name	NRCS Map Unit Characteristics	USDA Classification				NRCS Hydric Soil
			Depth	Drainage	Permeability	Landform	
An	Anahuac silt loam	N/A	Very deep	Moderately well drained	Very slowly permeable	Nearly level to gently sloping	Yes
Ba	Beaumont clay	N/A	Very deep	Poorly drained	Very slowly permeable	Nearly level	Yes
Bc	Beaumont-Urban land complex	N/A	Very deep	Poorly drained	Very slowly permeable	Nearly level	Yes
Bd	Bernard clay loam	N/A	Very deep	Somewhat poorly drained	Very slowly permeable	N/A	Yes
Bm	Bernard-Morey complex	N/A	Very deep	Somewhat poorly drained	Very slowly permeable	N/A	Yes
Fo	Leton silt loam	N/A	Very deep	Poorly drained	Slowly permeable	Depressions	Yes
FrB	Leton-Anahuac complex	undulating	Very deep	Poorly drained	Slowly permeable	Depressions	Yes
Ge	Gessner loam	N/A	Very deep	Poorly drained	Very slowly permeable	Depressions	Yes
LaA	Lake Charles clay	0-1% slopes	Very deep	Moderately well drained	Very slowly permeable	N/A	Yes
LcB	Lake Charles clay	1-3% slopes	Very deep	Moderately well drained	Very slowly permeable	N/A	No
Mo	Morey silt loam	leveled	Very deep	Somewhat poorly drained	Slowly permeable	Nearly level	Yes
VaA	Vamont clay	0-1% slopes	Very deep	Somewhat poorly drained	Very slowly permeable	Nearly level	Yes
VaB	Vamont clay	1-5% slopes	Very deep	Somewhat poorly drained	Very slowly permeable	Nearly level	No

5.1.7 WATER RESOURCES

Chambers County has abundant water resources, with its south border formed by Trinity Bay, Galveston Bay, and the Gulf of Mexico and west border by Cedar Bayou. Other prominent

water features in the area include Dutton Lake, Old River Lake, Lake Charlotte, Lake Anahuac, the Lost River, and the Trinity River. The low, flat topography invites freshwater and tidal influence to create a variety of aquatic ecosystems mentioned above in Section 5.1.1 General Region Information[18].

The watersheds or river basins that contribute water resources into the areas adjacent to the survey area are the San Jacinto, Trinity San Jacinto, and the Trinity. The proposed project site is located within the Trinity San Jacinto, and the Trinity[27].

According to the Texas Parks and Wildlife Department (TPWD) available digital data, Old River (0.5 mile east of the survey area) and the Trinity River (seven miles east of the survey area) are designated as Ecologically Unique River and Stream Segments[28].

Based on the background review, the water resources in the survey area include wetlands, irrigation and drainage canals, ponds, and streams. The San Jacinto River is approximately 6.5 miles west of the survey area. The Trinity River is approximately seven miles east of the survey area. Alligator Bayou, Cedar Bayou, Cotton Lake, Lake Anahuac, Lake Charlotte, Lost Lake, Lost River, Old River Lake, Scott Bay and Trinity Bayou occur within 10 miles of the survey area.

The USFWS National Wetland Inventory (NWI) data within, and immediately adjacent to, the proposed project area is demonstrated in Figure 5 (Appendix B)[29].

5.1.8 VEGETATION

Historically, the native plant community of the region was Coastal Prairie, which is a tallgrass prairie with scattered trees. Most of the native coastal prairie is now pastureland, cropland, or residential, urban, commercial, and industrial development[16].

According to the Texas State Historical Association, common plant communities in the county include tallgrasses, live oaks, cypress, pine, and bottomland hardwoods[18].

5.2 PROTECTED SPECIES

5.2.1 THREATENED OR ENDANGERED SPECIES LIST

Threatened, endangered, and candidate species listed by the USFWS and TPWD as having the potential to occur in Chambers County[30, 31] are provided in Table 4.

Table 4. USFWS/TPWD List of Threatened or Endangered Species for Chambers County, Texas[30, 31]

Common Name	Scientific Name	Species Group	USFWS List Status	TPWD List Status
green sea turtle	*Chelonia mydas*	reptiles	E, T	T
hawksbill sea turtle	*Eretmochelys imbricata*	reptiles	E	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	reptiles	E	E
leatherback sea turtle	*Dermochelys coriacea*	reptiles	E	E
loggerhead sea turtle	*Caretta caretta*	reptiles	T	T
Louisiana black bear	*Ursus americanus luteolus*	mammals	-	T
piping plover	*Charadrius melodus*	birds	E, T	T
red wolf	*Canis rufus*	mammals	-	E
smalltooth sawfish	*Pristis pectinata*	fishes	-	E
Sprague's pipit	*Anthus spragueii*	birds	C	-

5.2.2 THREATENED OR ENDANGERED SPECIES DESCRIPTIONS

A brief description of these species and their habitat requirements are included below.

Piping Plover

Piping Plovers are small, migratory shorebirds approximately 5-7 inches in length with a wingspan of approximately 15 inches. These birds have a short, black and orange bill that varies in color depending on the time of year, orange legs, pale gray back and dorsal wings, white undersurface, black breastband, and white collar[32].

Three main breeding populations of Piping Plovers have been distinguished by geographic region within the US: Great Lakes, Northern Great Plains, and Atlantic Coast. These three populations winter on beaches and barrier islands in the South Atlantic, Gulf, and Caribbean coasts, including the Bahamas and West Indies. Studies have shown that birds from the Great Lakes and Northern Great Plains regions primarily winter along the Gulf Coast. Individuals from the Atlantic Coast population have been observed on the Gulf Coast as well. Piping Plovers generally begin arriving on the Texas coast in mid-July and begin leaving for the breeding grounds in late February. It is believed that the migration to and from wintering grounds is a non-stop

effort. Few birds remain on the Texas coast year round, but they are thought to be non-breeders[32].

Wintering habitat includes foraging and roosting habitat types. Preferred foraging habitat includes wet sand in the wash zone, bare to sparsely vegetated, intertidal ocean beaches, wrack lines, shorelines of streams, ephemeral ponds, lagoons, salt marshes, emergent seagrass beds, wash-over passes, mudflats, sandflats, or algal flats. Most preferred foraging habitats are dynamic systems that fluctuate with the tide and wind. Preferred roosting habitat includes sandy beaches, often with cover such as driftwood, seaweed clumps, small dunes, and debris. Spoil islands along the Intracoastal Waterway are known to be utilized by this species. Piping Plovers are known to occupy similar habitats as other shorebirds such as Willets, Ruddy Turnstones, Dowitchers, Sandpipers, American Oystercatchers, and other plovers[32,33].

These shorebirds forage on exposed beach substrates, pecking for prey at or just below the substrate surface. They feed on marine worms, beetles, flies, spiders, aquatic invertebrates, crustaceans, and mollusks, as well as their eggs and larvae[32].

Sprague's Pipit

Sprague's pipits are small, migratory passerines with a slender shape and relatively narrow bill. Their underparts are brown with broad black streaks. Legs are yellowish to pale brown. The upper mandible is dark and contrasts with the pale lower mandible[34].

The only population of Sprague's pipit occurs within North America. Known breeding sites are located in Canada, Montana, North and South Dakota, and Minnesota. Wintering grounds are located in Arizona, New Mexico, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and northern Mexico. Migration occurs in April to May and September to November[34].

Preferred habitat includes well drained, open grasslands with native midgrasses of intermediate thickness and with moderate litter depths. Preferred grasslands are undisturbed. Grazing, prescribed burning, or mowing can be tolerated after one year. Food primarily consists of arthropods, but occasionally seeds. Nests are a cup shape on the ground, made of woven dried grasses. Average clutch size is 4.5 and young are cared for by the female for approximately 25 days until fledging[34].

Smalltooth Sawfish

Smalltooth sawfish are large elasmobranchs. They have a body similar to shark with ventral gill slits like a ray. Most notable is the long, flat snouts with pairs of teeth along the edges. Smalltooth sawfish can grow up to 25 feet in length[35].

The toothed snout is used to locate, stun, and kill fish and crustaceans. These sawfish are ovoviviparous, usually with litters of 15-20 pups[35].

Preferred habitat includes shallow coastal seas and estuaries with muddy and sandy bottoms. They are typically found close to shore, in sheltered bays and on shallow banks[35].

The US population of smalltooth sawfish is found in the Gulf of Mexico and Atlantic Ocean. Historically, these sawfish could be found throughout the Gulf of Mexico. Today, their range has shrunk to peninsular Florida[35].

Hawksbill Sea Turtle

The USFWS describes the hawksbill sea turtle as a small to medium-sized marine turtle with a reddish-brown carapace. The head is relatively small with a distinctive hawk-like beak. The adult hawksbill is commonly 2.5 feet in length and weighs between 95 to 165 pounds[36].

Hawksbill hatchlings live in a pelagic environment, specifically in the weedlines that accumulate at convergence zones. Juveniles will return to a coastal environment when their carapace reaches approximately 20-25 centimeters in length. Juveniles and adults will spend most of their time in their primary foraging habitat, coral reefs. The hawksbill feeds primarily on sponges[36].

Hawksbill turtle nesting occurs sometime between April and November. Nesting is nocturnal and occurs every 2 to 3 years, 4 to 5 times per season, approximately every 14 days. Preferred nesting habitat includes low and high energy beaches in tropical oceans. Nesting habitat is often shared with green sea turtles. Hawksbills can traverse beaches limited to other species of sea turtles with their ability to traverse fringe reefs. Hawksbills have a tolerance for a variety of nesting substrates and often build their nests under vegetation[36].

The hawksbill is found in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. Hawksbills are typically associated with rocky areas and coral reefs in water less than 65 feet. Mexico is now considered the most important region for hawksbills in the Caribbean yielding 3,000 to 4,500 nests/year. The Hawksbill is an occasional visitor to the Texas coast[36].

Loggerhead Sea Turtle

The loggerhead sea turtle is reddish-brown marine turtle characterized by a large head with blunt jaws. Adults can be up to 500 pounds and 4 feet in length. Adult loggerheads feed on jellyfish, floating egg clusters, flying fishes, mollusks, crustaceans, and other marine animals[37].

Loggerheads occupy three ecosystems according to lifestage: terrestrial zone, neritic zone, and oceanic zone. The terrestrial zone is occupied briefly during nesting and hatching activities. Hatchlings move out to the oceanic zone until their carapace reaches approximately 40-60 centimeters in length. Juveniles and adults primarily occupy the neritic zone (nearshore marine environment)[37].

The nesting season in the US is May through August. Nesting occurs every 2 to 3 years and is mostly nocturnal. Females can nest up to 5 times per season at intervals of approximately 14 days. Hatchling emergence is mostly nocturnal. Loggerheads nest on oceanic beaches between the high tide line and dune fronts and occasionally on estuarine shorelines with suitable sand. Females prefer narrow, steeply sloped, coarse-grained beaches[37].

Distribution of the loggerhead includes the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Although the majority (~80%) of the US nesting activity occurs in south Florida, loggerheads nest along the Gulf and Atlantic coastlines from Texas to Virginia. Loggerheads are considered an occasional visitor to Texas[37].

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle is considered the smallest sea turtle with an olive-gray carapace and a triangular shaped head and a hooked beak. Adults can grow to about 2 feet in length and weigh up to 100 pounds. This turtle is a shallow water benthic feeder

with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs[38].

Kemp's ridleys, similar to loggerhead sea turtles, occupy three ecosystems according to lifestage: terrestrial zone, neritic zone, and oceanic zone. The terrestrial zone is occupied briefly during nesting and hatching activities. Hatchlings move out to the oceanic zone for an average of 2 years. Juveniles and adults primarily occupy the neritic zone (nearshore marine environment)[38].

Most nesting occurs on the eastern coast of Mexico, however a small number consistently nest at Padre Island National Seashore in Texas and various other locations along the Gulf and lower Atlantic coasts. Nesting occurs from May to July during daylight hours. Large numbers of females emerge for a synchronized nesting event referred to as "arribada". Arribadas are thought to be caused by female pheromone release, offshore winds, and/or lunar cycles. Females nest up to 4 times per season at intervals of 10 to 28 days. The preferred nesting beaches are adjacent to extensive swamps or large bodies of open water[38].

The Kemp's ridley turtles range includes the Gulf coasts of Mexico and the US, and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland[38].

Green Sea Turtle

The green sea turtle can grow to 4 feet in length and reported weights vary from 350-850 pounds. The carapace is smooth and keelless, and the color varies with shades of black, gray, green, brown, and yellow. Adults are herbivorous. Hatchlings are omnivorous[39].

Greens occupy three ecosystems according to lifestage: terrestrial zone, neritic zone, and oceanic zone. The terrestrial zone is occupied briefly during nesting and hatching activities. Hatchlings move out to the oceanic zone until their carapace reaches approximately 20-25 centimeters in length. Juveniles and adults primarily occupy benthic feeding grounds in shallow, protected waters. Preferred feeding grounds include pastures of seagrasses and/or algae[39].

Green turtles have a worldwide distribution in tropical and subtropical waters. The nesting season in the southeastern US is June through September. Nesting is nocturnal and occurs in 2, 3, or 4-year intervals. Females nest an average of 5 times per season at 14

day intervals. Hatchlings typically emerge at night. Approximately 200 to 1,100 females are estimated to nest on US beaches. Nesting occurs on high energy oceanic beaches, primarily on islands with minimal disturbance. Green turtles return to the same nesting sight and are known to travel long distances between foraging areas and nesting beaches[39].

Leatherback Sea Turtle

The leatherback sea turtle is the largest sea turtle. The adult leatherback can get up to 8 feet in length and up to 2000 pounds. The turtle lacks a "normal" turtle shell and is covered by firm, rubbery skin that is approximately 4 inches thick. Coloration is predominantly black with varying degrees of pale spotting; including a notable pink spot on the dorsal surface of the head in adults. Diet is primarily jellyfish and salp, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed[40].

Leatherbacks are highly migratory and the most pelagic of all sea turtles. Females prefer high energy, sandy beaches with vegetation immediately upslope and a beach sloped sufficiently so the crawl to dry sand is not too far. Preferred beaches have deep, unobstructed oceanic access on continental shorelines[40].

In the United States, nesting occurs from March to July. Females nest on average 6 times per season at 10 day intervals. Most leatherbacks return to their nesting beaches at 2 to 3-year intervals[40].

Distribution is worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. The leatherback is also found in small numbers as far north as British Columbia, Newfoundland, and the British Isles and as far south as Australia and Argentina. The leatherback has a small presence in the US with most nesting occurring on the Florida east coast, Sandy Point, US Virgin Islands, and Puerto Rico[40].

Louisiana Black Bear

The Louisiana black bear (LBB) is a large mammal with long black hair and a short tail. The facial profile is blunt, eyes small, and a broad nose pad with large nostrils. The muzzle of the LBB is yellowish-brown. Some bears have a white patch on the lower

throat and chest. Adult males are typically larger, ranging from 300-400 pounds. Adult females range in weight from 120-180 pounds. The LBB is 4 to 7 feet in length[41].

Originally, LBB were known to occur in the forests of eastern Texas, Louisiana, and Mississippi. They typically inhabit bottomland hardwood forests. Other habitat types the LBB utilizes include brackish and freshwater marshes, salt domes, and agricultural fields. These bears require large, remote tracts of land with minimal human disturbance. The last known populations in eastern Texas were in the swamps and thickets of the Big Thicket region of southeast Texas. Today, LBBs primarily occur within the boundaries of the state of Louisiana. The largest concentration exists in the Atchafalaya River and Tensas River Basins[41].

LBBs are opportunistic feeders with a diet that may consist of acorns, berries, carrion, and insect larvae. In addition the bears may feed on agricultural products such as corn, wheat, and sugarcane[41].

The breeding period for LBBs is the summer. Females begin breeding around 3 years of age and have a gestation period of 7 or 8 months. Litter size ranges from 1 to 4 being born every other year in January or February[41].

Red Wolf

The red wolf is one of only two wolf species in the world. Their fur is a reddish color and they are smaller in size than the gray wolf. The average adult red wolf grows up to 4 feet in length and 50-80 pounds[42].

Originally, the red wolves were found throughout the southeastern US. The USFWS declared the red wolf extinct in the wild in 1980. In 1987, captive individuals were released to the wild in North Carolina. This reintroduced population is reportedly thriving and growing[42].

Red wolves feed on rabbits, deer, raccoons, and rodents. They live in packs of 5-8, which typically consists of one breeding pair and their offspring[42]. Little information is available describing red wolf preferred habitat characteristics.

According to the USFWS, there is no designated critical habitat for any of the federally-listed threatened and endangered species within at least 15 miles of the survey area[43].

5.2.3 TEXAS NATURAL DIVERSITY DATABASE RESULTS

A records review of the Texas Natural Diversity Database (TNDD) was completed for the proposed project area and surrounding areas by the TPWD on 20 February 2012. No elements of occurrence (EO) are located within the proposed project area. The EO closest to the proposed project area (EO ID 1808) is approximately 8.3 miles to the east and is listed as a bald eagle last observed in 1996[44].

5.2.4 MARINE MAMMAL HABITAT

Marine mammals are ecologically restricted to marine and estuarine habitats. The closest marine or estuarine habitat to the project area (Trinity Bay) is approximately 10 miles to the south. Marine mammals with the potential to occur in Trinity Bay, as well as the entire Galveston Bay system, include bottlenose dolphins and West Indian manatees. Bottlenose dolphins are fairly common within the Galveston Bay system. West Indian manatees are a rare occurrence. The last known occurrence found was in 1995[45].

6.0 PROTECTED SPECIES HABITAT EVALUATION

WGI completed a protected species habitat evaluation on 1 May 2012 to determine if habitat within the project area was likely to support any of the federally-protected species potentially occurring in Chambers County. The field surveys included a pedestrian survey of the proposed project area and the portions of the surrounding facility that are not restricted by stringent safety requirements. The field surveys also included a windshield survey of all terrestrially accessible habitats visible from public areas within a three-mile radius of the project area. The majority of the lands within the three-mile radius are privately-owned and not visible or accessible from public areas. An aerial survey was conducted of the three-mile radius to observe the inaccessible areas and survey for the presence of bald or golden eagles or evidence of their nests. Data were collected to describe resident vegetation communities and assess the potential for occurrence of protected species. The dominant habitats observed are described below and demonstrated in Figure 6 (Appendix B). Photographs of the proposed project area and accessible surrounding areas are included as Appendix C. A summary of the field survey data is provided in Appendix D.

6.1 PLANT COMMUNITIES OBSERVED

The proposed project area is previously disturbed by industrial activities. The northwest corner of the project area is maintained pastureland. The northeast corner is an active flare stack and adjacent pit. The remainder of the project area is currently being utilized as a staging area for the construction of Frac VI. The staging area consists of road base, temporary buildings, vehicles, and equipment. No vegetation was observed in the staging area.

Immediately to the east of the project area is a brine pond. Immediately to the south are Fractionator VI (under construction) and Fracs IV and V. To the north are drainage canals, industrial ponds, and an industrial facility. To the west are agricultural fields. The majority of the Mont Belvieu Complex is industrial infrastructure, concrete, caliche, or asphalt.

Cedar Bayou has been straightened in this area and is not likely tidal within the three-mile radius. The remaining oxbows from the previous Cedar Bayou channel appear to have little to no hydrologic connection to the current Cedar Bayou channel. These oxbows appear to be functioning as open waters or wetlands. Cedar Bayou is approximately 1.95 miles to the south-southwest of the project area at its closest point.

The dominant habitats observed in the areas surrounding the Mont Belvieu Complex include: wetland, pastureland, mixed woodland, open water, and canals. A significant portion of these habitats have historically been manipulated or impacted by industrial and agricultural development.

Wetland – This habitat is a mosaic of emergent, scrub-shrub, and forested wetlands. This habitat includes some Cedar Bayou oxbows. Dominant species observed within the wetland mosaic included *Fraxinus pennsylvanica* (green ash), *Juncus effusus* (common rush), *Saccharum giganteum* (sugarcane plumegrass), *Triadica sebifera* (Chinese tallow), *Baccharis halimifolia* (eastern baccharis), *Typha latifolia* (broadleaf cattail), and *Panicum repens* (torpedo grass). Dominant species observed within or on the banks of some Cedar Bayou oxbows included *Taxodium distichum* (bald cypress), *Quercus nigra* (water oak), *Liquidambar styraciflua* (sweetgum), *Nuphar lutea* (yellow pond-lily), *Rhynchospora corniculata* (shortbristle horned beaksedge), *Cyperus odoratus* (fragrant flatsedge), and *Cephalanthus occidentalis* (buttonbush).

Pastureland – This habitat is primarily maintained and dominated by non-native species. Dominant species observed included *Cynodon dactylon* (bermudagrass), *Verbena*

brasiliensis (Brazilian vervain), *Paspalum dilatatum* (dallisgrass), *Rubus trivialis* (southern dewberry), and *Coreopsis basalis* (coreopsis).

Mixed woodland – This habitat is includes woodland communities dominated by Chinese tallow, willow oak, or loblolly pine. Woodlands observed are small to medium, fragmented tracts subject to disturbance from utility lines and industrial and agricultural development. Dominant species observed collectively include Chinese tallow, *Quercus phellos* (willow oak), *Pinus taeda* (loblolly pine), *Celtis laevigata* (sugar hackberry), *Melia azedarach* (Chinaberry), *Quercus falcata* (southern red oak), *Campsis radicans* (trumpet creeper), *Ligustrum sinense* (Chinese privet), *Sabal minor* (dwarf palmetto), and *Smilax rotundifolia* (common greenbrier).

Open water – This habitat includes man-made retention ponds, brine ponds, irrigation ponds, and some Cedar Bayou oxbows. Dominant species observed along the banks of ponds (if vegetated) included bermudagrass, *Cyperus entrerianus* (woodrush flatsedge), and *Stenotaphrum secundatum* (St. Augustine grass). Dominant species observed along the banks of the Cedar Bayou oxbows included bermudagrass, *Carex cherokeensis* (Cherokee sedge), *Sorghum halepense* (Johnsongrass), water oak, sweetgum, Chinese tallow, *Acer negundo* (boxelder), green ash, and dwarf palmetto.

Riverine – This habitat includes Cedar Bayou. Dominant species observed included bermudagrass, Cherokee sedge, Johnsongrass, Chinese tallow, boxelder, green ash, and dwarf palmetto.

Canals – This habitat includes man-made drainage, flood control, and irrigation canals. The banks of these canals are maintained and dominated by bermudagrass, woodrush flatsedge, and St. Augustine grass.

6.2 PROTECTED SPECIES HABITAT ANALYSIS

The green, hawksbill, Kemp's ridley, leatherback, loggerhead sea turtles, smalltooth sawfish, as well as marine mammals, are restricted to marine or estuarine environments. There are no marine or estuarine environments within at least 10 miles of the project area. Habitat with the potential to support any of these species does not exist in or near the project area.

The proposed project area consists of maintained pastureland, roadbase, temporary buildings, and a flare stack and pit. The potential exists for migratory birds to utilize the maintained pastureland. This area does not possess habitat with the potential to support any additional federally-protected species. Land use and habitat types outside the proposed project area include industrial and agricultural development, wetland, pastureland, mixed woodland, open water, riverine, and canals. The areas surrounding the project location have historically been impacted by industrial and agricultural activities.

Industrial development areas are typically comprised of mainly impervious cover with minimal vegetation on site. Therefore, these areas are not likely to support any federally-protected species.

Agricultural areas have the potential to support migratory birds. Habitat to support federally-protected species other than migratory birds is not likely to occur in agricultural areas.

The wetland habitat observed is a mosaic of emergent, scrub-shrub, and forested wetlands. This habitat also includes some Cedar Bayou oxbows, which are inundated emergent wetlands with scattered trees or shrubs. Based on the historic aerial photography and the pedestrian survey, this habitat has historically been impacted by utilty lines, industrial development, and stream channelization. The observable quality of this habitat ranges from low to moderate. The wetland habitat areas have the potential to support migratory birds, bald or golden eagles, and other wildlife. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

The pastureland habitat is primarily maintained and dominated by non-native species. The observable quality of this habitat ranges from low to moderate. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize this habitat. The potential exists for Sprague's pipit to utilize this habitat during winter months. However, the potential is minimal as these birds prefer undisturbed native grasslands. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

The woodland habitat includes communities dominated by Chinese tallow, willow oak, or loblolly pine. Woodlands observed are small to medium, fragmented tracts subject to disturbance from utility lines and industrial and agricultural development. The observable quality of this habitat ranges from low to moderate. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize the mixed woodland habitat. Although some

characteristics of these mixed woodlands meet the qualifications for LBB habitat, these woodlands are not large enough, not continuous, and are frequently subject to human disturbance. These woodlands would not likely support LBB. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

The open water habitat includes man-made retention ponds, brine ponds, irrigation ponds, and some Cedar Bayou oxbows. Many of these ponds support adjacent industrial facilities. The observable quality of these open water habitats ranges from low to moderate. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize this habitat. The potential exists for Sprague's pipit to utilize this habitat during winter months. However, the potential is minimal as these birds prefer undisturbed native grasslands, which are not present in this area. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

The riverine habitat includes Cedar Bayou. Based on the historic aerial photography and topographic maps, this stream has been straightened and has been historically impacted by industrial and agricultural development. Multiple outfall structures exist along this stream. The observable quality of this habitat ranges from low to moderate. Cedar Bayou is neither tidal nor a designated navigable water of the US within at least 3 miles of the project area. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize this habitat. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

The canal habitat includes man-made drainage, flood control, and irrigation canals. The observable quality of this habitat ranges from low to moderate. The potential exists for migratory birds, bald or golden eagles, and other wildlife to utilize this habitat. Various migratory birds, including songbirds and hawks, were observed in or near this habitat. No bald or golden eagles or their nests were observed in or near this habitat.

7.0 AIR QUALITY ANALYSIS RESULTS

7.1 ESTIMATED TOTAL ANNUAL EMISSION RATE OVERVIEW

PSD review is triggered for CO. A State NAAQS analysis is required for NO_2, SO_2, PM_{10}, and $PM_{2.5}$. The proposed emissions of SO_2 and H_2S are also subject to review under 30 TAC Chapter 112. Speciated VOC compounds require a health effects evaluation and comparison to the TCEQ ESL.

RPS completed detailed pollutant emission calculations for the Enterprise project in accordance with the PSD and State NAAQS analysis requirements. This BA does not include detailed estimated emission rates. Estimated emission rates and descriptions of emission calculation methods are available upon request.

A summary, provided by RPS, of the total estimated annual emission for PSD criteria pollutants that would be emitted by the proposed project are provided in Table 5.

Table 5. Emission Point Summary

Emission Point Description	Air Pollutant Name	Air Pollutant Emission Rate (Tons per Year)
Hot Oil Heater (2)	NO_x	15.33
	SO_2	1.52
	PM	2.45
	CO	27.36
	VOC	1.23
Regenerant Heater (2)	NO_x	3.12
	SO_2	0.31
	PM	0.62
	CO	5.57
	VOC	0.25
Refrigerant Condenser (2)	PM	1.44
	PM_{10}	0.99
	$PM_{2.5}$	0.38
Frac A Process Fugitives	VOC	2.00
Frac B Process Fugitives	VOC	2.00

Emission Point Description	Air Pollutant Name	Air Pollutant Emission Rate (Tons per Year)
Reflux Cooler (2)	PM	0.34
	PM_{10}	0.23
	$PM_{2.5}$	0.09
Lean Amine Tank (2)	VOC	<0.01
Amine Tank (2)	VOC	<0.01
Wastewater Tank (2)	VOC	0.03
DIB Unit Process Fugitives	VOC	1.61
Flare	NO_x	14.99
	SO_2	9.18
	CO	44.19
	VOC	4.4
	H_2S	0.1

In addition to the emission rates calculated for PSD criteria pollutants, RPS calculated emission rates for other pollutants that will be emitted by the project. This analysis was performed in accordance with TCEQ guidelines on the modeling of non-criteria pollutants. The predicted increases in pollutant concentrations were compared to the TCEQ ESLs. ESLs are not ambient air standards, but instead are screening concentrations used by TCEQ to assess the potential of the emissions to impact public health and welfare. ESLs are set by TCEQ at a level well below which adverse health effects on humans have been observed to occur. In addition to human health effects, ESLs are based on the potential for odors to be a nuisance and effects on vegetation. Therefore, if predicted concentrations of a constituent do not exceed an ESL, adverse health or welfare effects are not expected. In the first level of analysis conducted for permitting of new emissions, the predicted increase in concentration of a pollutant is compared to 10% of the ESL. If the predicted concentration increase is less than this level, no further analysis is required, and it is concluded that the emissions of that pollutant from the project pose no significant additional impact on public health and welfare.

A comparison of the modeled concentrations of the project's non-criteria pollutant emissions to TCEQ established ESLs is shown in Table 6 below. Based on these results, the maximum

predicted concentrations of all modeled pollutants is well below the respective ESL and also well below the first screening level of 10% of the ESL. Accordingly, no adverse welfare impacts are expected to occur within the action area as the result of the additional emissions of these pollutants.

Table 6. Non-Criteria Pollutant Modeling Results

Compound	CAS	Model Results		
		Maximum Off-Property Conc. (µg/m³)	ESL (µg/m³)	Conc./ ESL %
Formaldehyde	50-00-0	0.022	15	0.15%
Isobutane	75-28-5	35.007	4800	0.73%
Butane	106-97-8	39.109	23750	0.16%
Isopentane	78-78-4	1.383	3800	0.04%
Pentane	109-66-0	2.484	4100	0.06%
Hexane	110-54-3	59.716	5300	1.13%
Heptane	142-82-5	59.283	3500	1.69%
Toluene	108-88-3	0.220	640	0.03%
Diethanolamine	111-42-2	0.013	10	0.13%
Carbon Dioxide	124-38-9	37543.052	simple asphyxiant	--
Methane	74-82-8	17.230	simple asphyxiant	--
Nitrous Oxide	10024-97-2	0.070	4500	0.002%

7.2 AREA OF IMPACT DISPERSION MODELING RESULTS

RPS performed dispersion modeling of the air pollutant emissions from the proposed project in accordance with the procedures outlined in the applicable EPA and/or TCEQ guidance documents (available upon request). This section provides the methods and results of the dispersion modeling.

7.2.1 DISPERSION MODELING METHODS

This section discusses air quality monitoring, including preconstruction monitoring requirements, and presentation of these data. For the PSD and State NAAQS analysis, all of the

modeling results are below the SILs; therefore, background ambient monitoring data is not relevant to this evaluation. The modeling methods were provided by RPS[46].

Table 7. Standards for Comparison with Modeling for Criteria Pollutants[46]

Pollutant	Regulation	Averaging Period	Modeling Deminimis (µg/m3)	Standard (µg/m3)
SO_2	Chapter 112	30-min	20.4	1021
	NAAQS	1-hr	7.8	195
		3-hr	25	1300
		24-hr	5	365
		Annual	1	80
	Increment	3-hr	25	512
		24-hr	5	91
		Annual	1	20
	PSD Monitoring	24-hr	13	NA
NO_2	NAAQS	1-hr	7.5	188.7
		Annual	1	100
	Increment	Annual	1	25
	Monitoring	Annual	14	NA
CO	NAAQS	1-hr	2000	40,000
		8-hr	500	10,000
	PSD Monitoring	8-hr	575	NA
PM_{10}	NAAQS	24-hr	5	150
	Increment	24-hr	5	30
		Annual	1	17
	PSD Monitoring	24-hr	10	NA
$PM_{2.5}$	NAAQS	24-hr	1.2	35
		Annual	0.3	15
	Increment	24-hr	1.2	9
		Annual	0.3	4
	PSD Monitoring	24-hr	4	NA

The model parameters specified for the modeled location, such as meteorological data and receptor grids, are discussed below. The remaining modeled parameters were determined by the EPA-recommended "regulatory default option," which includes the use of stack-tip downwash, the effects of elevated terrain, and calms and missing data processing routines[46].

7.2.1.1 AERMOD

Modeling was performed using the Advanced Monitoring Systems/EPA Regulatory Model (AERMOD) (version number 12060). The AERMOD model was chosen because it is approved by the EPA as a Preferred/Recommended model and is approved by the TCEQ modeling staff[46].

AERMOD is a steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD determines concentrations from multiple point, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. The model employs hourly sequential preprocessed (AERMET) meteorological data to estimate concentrations. The Oris Solutions, LLC software program, "BEEST for Windows", was used to set up the model inputs and used to perform the model runs[46].

7.2.1.2 Meteorological Data

The meteorological data used in the models includes observed hourly wind speed, wind direction, temperature and numerous other parameters. This data is used, along with other inputs, by the models to determine the dispersion of the emissions from sources in the model input[46].

AERMOD requires input from a preprocessor (AERMET) that organizes and processes meteorological data and estimates the necessary boundary layer parameters for dispersion calculations. Several parameters are used to describe the character of the modeled domain, including surface roughness length, albedo and Bowen ratio. These parameters are incorporated into the surface meteorological data set used by AERMOD. TCEQ has developed three separate AERMOD-ready meteorological data sets for each county in the state. The different data sets correspond to three categories of surface roughness length[46]:

- Category 1 – LOW

Appropriate for flat areas with surface roughness lengths of 0.001 m - 0.1 m

- Category 2 – MEDIUM

Appropriate for rural/suburban areas with surface roughness lengths of 0.1 m – 0.7 m

- Category 3 – HIGH

Appropriate for urban/industrial areas with surface roughness lengths of 0.7 m - 1.5 m

To determine which land use category is appropriate, the recently released AERSURFACE preprocessor was used. As discussed in the EPA's AERSURFACE User's Guide (EPA-454/B-08-001), the surface roughness length is related to the height of obstacles to the wind flow and is, in principle, the height at which the mean horizontal wind speed is zero based on a logarithmic profile. The surface roughness length influences the surface shear stress and is an important factor in determining the magnitude of mechanical turbulence and the stability of the boundary layer. AERSURFACE utilizes land use data available from the 1992 National Land Cover Data (NLCD). A 1 km radius, the default, was used to determine the appropriate surface roughness value[46].

Given that the surface roughness calculated from AERSURFACE (Zo = 0.124) is within the TCEQ's medium roughness range, per background information document ftp://ftp.tceq.state.tx.us/pub/OPRR/APD/AERMET/AERMETv06341/BackgroundInformation/aermet.pdf, the pre-processed TCEQ AERMET data corresponding to medium roughness was used[46].

The preprocessed (via AERMET) meteorological data sets for 1987, 1988, 1989, 1990, and 1991 were obtained from the TCEQ. Although all pollutants evaluated besides CO are a State NAAQS analysis, the five years of meteorological data are being used due to the nature of 1-hr NO_2, 1-hr SO_2, and 24-hr $PM_{2.5}$ NAAQS standard, in which the preliminary impact analysis uses the highest of the 5-year averages of the maximum modeled 1-hr or 24-hr concentrations predicted each year at each receptor, based on 5 years of National Weather Service data. To be consistent, five years of meteorological data was used for all the criteria pollutants. For the health effects analysis and state property line analysis of H_2S, the preprocessed meteorological data for 1988 was obtained from the TCEQ. Surface meteorological data was collected from the NWS station in Houston Intercontinental (IAH), Texas (Station Number 12960) for all years to be used in the analysis. The upper air meteorological data was obtained from the NWS station in Lake Charles (LCH), Louisiana (Station Number 3937) for all years to be used in the analysis. The meteorological files used in the modeling are available upon request[46].

7.2.1.3 Terrain

The terrain height difference between the modeled source and each receptor can vary. For each source/receptor combination, the relationship may be characterized as flat terrain, simple

terrain, intermediate or complex terrain. This variation affects the dispersion and the relative plume height of modeled sources[46].

The terrain surrounding the site is described as generally flat with some minor elevation changes. AERMAP is a preprocessor program which processes the terrain information to provide inputs to AERMOD. AERMAP was used to process the terrain data in conjunction with the receptor grids, downwash structures, and sources to be used in AERMOD input files[46].

The receptor, source, and building base elevations were determined using data from USGS National Elevation Dataset (NED) files and the AERMAP processing program. The output from AERMAP provides not only base elevations for the receptors, but also an effective "hill height" that enables AERMOD to make more realistic simple to complex terrain concentration calculations[46].

7.2.1.4 Building Wake Effects

Building wake effects occur when the air flow around buildings influences the dispersion from sources in the model input, resulting in variations to air concentrations[46].

A building wake (downwash) analysis was performed to determine appropriate downwash parameters for the major structure at the facility. Downwash parameters were calculated using the Oris Software's BPIP-PRIME (Dated: 04112) Program. Only structures that are solid all the way to ground level were included in the downwash analysis. The emission point locations and heights for downwash structures are available upon request[46].

7.2.1.5 Receptor Grid

The receptor grid defines the locations at which the concentrations are calculated based on the dispersion of the emissions from the sources in the model input[46].

The receptor grid used to determine maximum off-property concentrations is an array of receptors with spacing of 25 and 100 meters. The modeling receptor grid was designed to sufficiently capture the maximum predicted concentrations and any exceedances at those locations. The modeling receptor grids were designed following TCEQ AQMG. The modeled sources are stacks affected by building wakes and other low level fugitive sources, which dictates the minimum 25-meter spacing of receptors. The receptor grid used for the modeling analyses was as follows[46]:

- 25-meter spacing on the entire property;
- 25-meter spacing extending from the property line out 100 meters and within ~500 meters of the nearest source;
- 100-meter spacing within 100 meters to ~1,000 meters of the sources;
- 500-meter spacing within 1,000 meters to ~5,000 meters of the sources; and,
- 1,000-meter spacing within 5,000 meters to ~10,000 meters of the sources

Please note that there are no other non-Enterprise properties within the facility fenceline, so no receptors were placed within the property fenceline and no single-property line petition is being used for the Air Quality Analysis[46].

7.2.2 DISPERSION MODELING RESULTS

Table 8 shows the maximum predicted concentrations due to the proposed project for each pollutant and averaging period. Note: These are not total ambient concentrations. These are predicted increases in ground level concentrations due to new emissions from the proposed project[46]. The maximum predicted concentrations listed in Table 8 would be limited to a maximum distance of 0.2 – 1.0 km from the project area, depending on pollutant and averaging period.

Table 8. Maximum Predicted Concentrations[46]

Pollutant	Standard	Averaging Period	Project GLCmax (µg/m3)	SIL (µg/m3)	Less Than SIL?
NO_2	NAAQS	1-hour	7.43	7.5	Yes
		Annual	0.73	1	Yes
CO	NAAQS	1-hour	621	2000	Yes
		8-hour	206	500	Yes
PM_{10}	NAAQS	24-hour	1.78	5	Yes
		Annual	0.43	1	Yes
$PM_{2.5}$	NAAQS	24-hour	1.13	1.2	Yes
		Annual	0.27	0.3	Yes
SO_2	NAAQS	1-hour	1.44	7.8	Yes
		3-hour	1.26	25	Yes
		24-hour	0.64	5	Yes
		Annual	0.11	1	Yes

The SIL is a level set by the EPA, below which, modeled source impacts would be considered insignificant. The GLCmax value is the maximum ground level concentration predicted by the

model for each pollutant and averaging period resulting from this project. If a GLCmax value is less than the SIL, the modeled source impacts are considered insignificant and are not considered to cause or contribute to a violation of a NAAQS or PSD Increment for that pollutant and averaging period. If a GLCmax is greater than the SIL, additional analysis is required to demonstrate that the project would not cause or contribute to a violation of the NAAQS or PSD Increment for that pollutant and averaging period.

All twelve of the project GLCmax values are less than the SIL: 1-Hour CO, 8-Hour CO, 24-Hour PM_{10}, annual PM_{10}, 24-Hour $PM_{2.5}$, annual $PM_{2.5}$, 1-Hour NO_2, annual NO_2, 1-Hour SO_2, 3-Hour SO_2, 24-Hour SO_2, and annual SO_2. These twelve source impacts are considered insignificant based on stringent limits set to protect the most sensitive human populations. Therefore, these twelve source impacts are not expected to impact federally-protected species and will be excluded from further analysis.

Based on the methods and inputs described in Section 7.2.1, the dispersion model predicts concentrations at specific downwind receptor locations for pollutant averaging periods. Since all pollutants and averaging periods were below the SIL at all locations outside of the Mont Belvieu Complex, the action area was determined based on the limits of other potential impacts including the existing Mont Belvieu Complex boundaries, the proposed project construction area, and the existing wastewater outfall structure. The construction area is demonstrated in Figure 2 (Appendix B). The outfall structure is located immediately north of the construction area. A circle with a 0.5 mile radius completely encompasses the Complex, the project construction area, and the outfall structure. The action area is conservatively defined as the area within this circle and is demonstrated in Figure 7 (Appendix B).

The action area was utilized to analyze the potential impacts to protected species and/or their habitat by the proposed project. The results of the analysis of potential impacts to protected species are presented in Section 8 below.

8.0 EFFECTS OF THE PROPOSED ACTION

This section presents the results of the analysis of potential impacts to federally-protected species as a result of the proposed project. The following impact sources are included in the analysis: air quality, water quality, noise pollution, infrastructure-related disturbance, human-related disturbance, and federally-protected species effects. This analysis is based on total

emissions and dispersion modeling data provided by RPS, field survey and background review data collected by WGI, and literature review and research of potential effects of known pollutants on flora and fauna.

8.1 AIR POLLUTION EFFECTS BACKGROUND RESEARCH

Resources were searched extensively for data, documentation, or research regarding the potential effects of pollutants on flora and fauna. WGI biologists also specifically searched for concentrations and length of time of exposure at which flora and/or fauna are impacted. However, very little information was located that included specific concentrations at which impacts occur on a long-term or short-term basis. A list of research resources is available upon request.

According to EPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," the data presented in Table 9 (Section 8.2.3) indicate the level, at or above which, airborne pollutant concentrations are known to cause significant impacts on flora and fauna. Concentrations at, or in excess of, any of the screening concentrations would indicate that the source emission may have adverse impacts on plants or animals. The estimation of potential impacts on flora and fauna is highly variable and dependent upon site-specific conditions[47].

8.2 AIR QUALITY EFFECTS

8.2.1 EMISSIONS

RPS completed detailed pollutant emission calculations for the Enterprise project in accordance with the Air Permit Application requirements. A summary of the total proposed annual emissions of each pollutant that would be emitted by the project are provided in Table 5 (Section 7.1).

RPS also performed dispersion modeling of the emissions of air pollutants from the proposed Enterprise project in accordance with the PSD Permit requirements. The results of the modeling are provided as a summary of the maximum predicted concentrations in Table 8 (Section 7.2.2).

The new facilities associated with the project primarily include two Frac units and one DIB unit. PSD review is triggered for CO. A State NAAQS analysis is required for NO_2, SO_2, PM_{10}, and $PM_{2.5}$. The proposed emissions of SO_2 and H_2S are also subject to review under 30 TAC Chapter 112. Speciated VOC compounds require a health effects evaluation and comparison to the TCEQ ESLs.

Enterprise will utilize the BACT to control emissions from the project and thus minimize impacts to the surrounding environment to the maximum extent practicable. The proposed emissions limits of each pollutant are consistent with both the TCEQ BACT guidance and the most stringent limits in the RBLC; and, are considered to be the top level of control available for the new facilities.

Emissions resulting from gasoline and diesel-fueled vehicles and equipment during construction and maintenance are considered negligible. The project will not require a significant increase in vehicle and equipment use compared to current daily emissions for the Mont Belvieu Complex.

8.2.2 FUGITIVE DUST

Dust will be emitted during the site work phase of the project. This emission will be minimal and temporary. Dust emissions are expected to be negligible after the site work activities are completed.

8.2.3 IMPACTS OF AIR POLLUTION SOURCES ON FLORA AND FAUNA

Since SILs are concentrations that represent thresholds of insignificant modeled source impacts, the pollutant concentrations predicted to be less than or equal to the SILs are expected to have no significant impact on flora and fauna.

The data presented in Table 9 below is taken directly from EPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals." The concentrations presented in Table 9 reflect vegetation sensitivity only. Vegetation sensitivity was determined based on visible damage or growth effects. For the purposes of this BA, only the screening concentrations for vegetation with the highest sensitivity are included for comparison with predicted project concentrations in Table 9. By focusing on the most sensitive species, we are thereby comparing the lowest level concentrations at which potential impacts may occur. The pollutants screened in the EPA document for direct and indirect sensitivity to animals did not include any of the pollutants subject to PSD review for this project[47].

Table 9. Comparison of EPA's Screening Concentrations of Vegetation Sensitivity to Predicted Concentrations[47]

Pollutant	Averaging Period	Project GLCmax (mg/m3)	EPA Screening Concentrations (mg/m3)
SO_2	1-hour	1.44	917
	3-hour	1.26	786
	Annual	0.11	18
NO_2	Annual	0.73	94-188

The estimated concentrations for comparable pollutants and averaging periods are each a small fraction of the total concentration for the area. Since no protected species habitat was identified within the action area, the proposed project emissions will not impact protected species or their habitat.

According to the EPA screening procedure, the concentration at which a pollutant impacts vegetation rises exponentially with the decrease in length of exposure. The screening concentrations not represented in Table 9 were not included in the EPA document, reportedly as a result of a lack of data available to provide a suitable screening concentration[47]. The values for project pollutants are significantly below the EPA screening concentrations. Therefore, it is reasonable to assume that vegetation located within or near the action area will not be adversely impacted by the project source emissions.

The action area is shown in Figure 7 (Appendix B). The action area includes five habitat types: pastureland, woodland, wetland, open water, and canal. Any of these five habitat types may be utilized by migratory birds. However, these habitats are low quality and disturbed by adjacent construction and industrial operations. No additional federally-protected species are likely to utilize the remaining areas within the action area.

The increased concentration of pollutants predicted to occur as a result of the Frac facilities project is a fraction of the total concentrations for the area. The total concentration for the area, which includes the predicted addition from the Frac facilities project, is below the NAAQS limit, which is set to protect the most sensitive populations. The total concentration for the area is a fraction of the screening level the EPA has determined could impair vegetation. Therefore,

any migratory birds with the potential to occur within the action area will not likely be directly impacted by the proposed project.

Since it has been determined that the potential indirect effects are unlikely to occur as a result of the proposed project, migratory birds with the potential to occur within the action area will not likely be indirectly impacted by the proposed project.

8.3 WATER QUALITY EFFECTS

8.3.1 WASTEWATER

The new Frac units will be located within the North Plant of the Mont Belvieu Complex. The North Plant currently discharges wastewater and stormwater under TPDES Permit Number 03499. The process wastewater from the new Fracs will be combined with that from other Frac units in the North Plant and will be treated in the North Plant's existing wastewater treatment system. The non-process wastewater (i.e., cooling water) will be discharged with only pH adjustment (no biological treatment). The non-process wastewater will be routed to the North Plant Outfall 001, which discharges into the Hatcherville Road Ditch and ultimately into Cedar Bayou.

The two new Frac units combined represent a flow increase of approximately 40%. No changes to the wastewater discharge (i.e., temperature change, pH change, pollutant concentration, etc.) other than an increase in flow rate are anticipated.

Best Management Practices will be utilized in accordance with Section 401 of the Clean Water Act and Chapter 279 of the Texas Water Code. Excess storm water from the sumps and from other paved areas will be routed to two retention ponds that will be constructed. The ponds will be used for sedimentation and oil retention, if needed. A new stormwater outfall will be permitted to authorize the discharge from the new ponds.

No stormwater effects to wildlife are expected as a result of the infrastructure construction or operation of the Frac facilities project. Although an increase in wastewater flow rate is expected, the Frac facilities wastewater is discharged into an upland drainage system, which will reduce the flow velocity before the discharge water reaches waters of the US. No wastewater effects to wildlife are expected as a result of the infrastructure construction or operation of the Frac facilities project.

8.3.2 SURFACE WATER

The action area is shown in Figure 7 (Appendix B). The two surface waters located within the action area are industrial ponds. These ponds are built to support adjacent industrial facilities and are not typically utilized by wildlife. Surface waters utilized by wildlife will not be impacted by air emissions from the proposed project. Federally protected species will not be directly or indirectly affected by surface water impacts from the proposed project.

8.4 NOISE EFFECTS

The contractor will consider, when feasible and possible, alternative work methods, which lessen or eliminate the use of noisy equipment. When exposure to noise cannot be prevented, the construction contractor will institute a noise monitoring program.

Few pieces of equipment required for construction have the potential to exceed 85 decibels at 50 feet from the source. The best available technology will be used to maintain noise levels during construction below 85 decibels measured at a distance of 50 feet from the source as much as practical.

Project engineers estimate that noise levels during operation should be comparable to noise levels from maintenance activities that currently take place at the plant.

No noise effects to wildlife are expected as a result of the infrastructure construction or operation of the Frac facilities project.

8.5 INFRASTRUCTURE-RELATED EFFECTS

Construction of the proposed project involves the addition of two Frac units and one DIB unit to the existing three Frac facilities within the North Plant. The proposed project area is currently maintained pastureland and a construction staging area surrounded by industrial infrastructure. The majority of the Mont Belvieu Complex is industrial infrastructure, concrete, caliche, or asphalt. A portion of the maintained pastureland will be impacted by the construction activities. This habitat is low quality. No species were observed in this habitat during the field survey. No impacts to wildlife as a result of the infrastructure construction of the Frac facilities project are anticipated.

8.6 HUMAN ACTIVITY EFFECTS

Construction and operation of the proposed project will not require significant additional human activity compared to typical maintenance activities that occur at the plant on a regular basis.

No additional effects to wildlife are expected as a result of the increase in human activity associated with the Frac facilities project.

8.7 FEDERALLY-PROTECTED SPECIES EFFECTS

8.7.1 FEDERALLY-LISTED SPECIES

8.7.1.1 Piping Plover

Potential to Occur in the Action Area

Piping Plovers are migratory birds and their breeding habitat is known to be the northern US and Canada. Therefore, the consideration of potential nesting habitat was excluded from this analysis. Potential habitat within the action area would be limited to wintering habitat (foraging and roosting). Preferred foraging habitat includes bare to sparsely vegetated beaches, salt marshes, emergent seagrass beds, wash-over passes, mudflats, sandflats, or algal flats. Most preferred foraging habitats are dynamic systems that fluctuate with the tide and wind. Preferred roosting habitat includes sandy beaches, often with cover such as driftwood, seaweed clumps, small dunes, and debris[32].

No habitat with the potential to support the Piping Plover was observed within the Mont Belvieu Complex.

Cedar Bayou is approximately 2 miles from the project area, at its closest point, and is not tidally-influenced in this area. Cedar Bayou does not have shorelines with adequate roosting or foraging habitat for the piping plover in this area. No other areas with adequate roosting or foraging habitat for the piping plover are located within at least 3 miles of the project area. No sources have been found to indicate the piping plover has been observed within the survey area.

Piping Plovers are known to prefer areas immediately adjacent to the coastline. The action area is located approximately 33 miles inland from the coast. The closest UFWS designated critical

habitat for the Piping Plover is approximate 35 miles south and southeast of the action area[41]. The closest, and most recent, recorded observations of Piping Plovers found occurred in 2008 (pre and post Hurricane Ike) in Apfel Park, Bolivar Flats, and Bolivar Penisula (approximately 35 miles south of the action area)[48].

Potential foraging and roosting habitat for the Piping Plover does not exist within the action area or within the 3-mile survey area. Piping Plovers are not known to occur, and are unlikely to occur, within the action area for this project.

Potential Effects to Piping Plovers

Potential foraging and roosting habitat for the Piping Plover does not exist within the action area or within the 3-mile survey area. Piping Plovers are not known to occur, and are unlikely to occur, within the action area for this project.

The Piping Plover will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the Piping Plover.

Determination of Effect

The proposed action will have no effect on the Piping Plover.

8.7.1.2 Green Sea Turtle

Potential to Occur in the Project Area

Nesting occurs on high energy oceanic beaches, primarily on islands with minimal disturbance. Juveniles and adults primarily occupy benthic feeding grounds in shallow, protected waters. Preferred feeding grounds include pastures of seagrasses and/or algae[39].

No habitat with the potential to support the green sea turtle was observed within the Mont Belvieu Complex.

No habitats with the potential to support the green sea turtle are located within at least 7 miles of the project area. The USFWS designated critical habitat for the green sea turtle is Culebra Island, Puerto Rico and its surrounding waters[43]. The closest known observations of green sea turtles found occurred in Galveston Bay (approximately 25 miles south of the project area)[49].

Potential foraging and nesting habitat for the green sea turtle does not exist within the action area or within the 3-mile survey area. Green sea turtles will not occur within the action area for this project.

Potential Effects to Green Sea Turtles

Potential foraging and nesting habitat for the green sea turtle does not exist within the action area or within the 3-mile survey area. Green sea turtles will not occur within the action area for this project.

The green sea turtle will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the green sea turtle.

Determination of Effect

The proposed action will have no effect on the green sea turtle.

8.7.1.3 Hawksbill Sea Turtle

Potential to Occur in the Action Area

Preferred nesting habitat includes low and high energy, vegetated beaches in tropical oceans with a variety of substrates. Juveniles and adults primarily occupy their primary foraging habitat, coral reefs[36].

No habitat with the potential to support the hawksbill sea turtle was observed within the Mont Belvieu Complex.

No habitats with the potential to support the hawksbill sea turtle are located within at least 7 miles of the project area. The USFWS designated critical habitat for the hawksbill sea turtle are the Mona and Monito Islands, Puerto Rico and their surrounding waters[43]. The most recent recorded observations of hawksbill sea turtles found occurred in in 1984 at an unknown location in Texas[50].

Potential foraging and nesting habitat for the hawksbill sea turtle does not exist within the action area or within the 3-mile survey area. Hawskbill sea turtles will not occur within the action area for this project.

Potential Effects to Hawksbill Sea Turtles

Potential foraging and nesting habitat for the hawksbill sea turtle does not exist within the action area or within the 3-mile survey area. Hawskbill sea turtles will not occur within the action area for this project.

The hawksbill sea turtle will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the hawksbill sea turtle.

Determination of Effect

The proposed action will have no effect on the hawksbill sea turtle.

8.7.1.4 Kemp's Ridley Sea Turtle

Potential to Occur in the Action Area

Nesting occurs on high energy oceanic beaches, primarily adjacent to extensive swamps or large bodies of open water. This turtle is a shallow water benthic feeder with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs[38].

No habitat with the potential to support the Kemp's ridley sea turtle was observed within the Mont Belvieu Complex.

No habitats with the potential to support the Kemp's ridley sea turtle are located within at least 7 miles of the project area. USFWS designated critical habitat is not yet designated for this species[43]. The closest known observations of Kemp's ridley sea turtles found occurred in Galveston Bay (approximately 25 miles south of the project area)[49]. The closest, and most recent, known observations of Kemp's ridley sea turtle nests found occurred on the Bolivar Peninsula in 2010 (approximately 35 miles south of the project area)[51].

Potential foraging and nesting habitat for the Kemp's ridley sea turtle does not exist within the action area or within the 3-mile survey area. Kemp's ridley sea turtles will not occur within the action area for this project.

Potential Effects to Kemp's Ridley Sea Turtles

Potential foraging and nesting habitat for the Kemp's ridley sea turtle does not exist within the action area or within the 3-mile survey area. Kemp's ridley sea turtles will not occur within the action area for this project.

The Kemp's ridley sea turtle will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the Kemp's ridley sea turtle.

Determination of Effect

The proposed action will have no effect on the Kemp's ridley sea turtle.

8.7.1.5 Leatherback Sea Turtle

Potential to Occur in the Action Area

Preferred nesting habitat includes high energy, sandy beaches with vegetation immediately upslope and a beach sloped sufficiently so the crawl to dry sand is not too far. Preferred beaches have deep, unobstructed oceanic access on continental shorelines. Juveniles and adults are pelagic and primarily occupy deep water habitat[40].

No habitat with the potential to support the leatherback sea turtle was observed within the Mont Belvieu Complex.

No habitats with the potential to support the leatherback sea turtle are located within at least 7 miles of the project area. The USFWS designated critical habitat for the leatherback sea turtle include the coastal waters adjacent to Sandy Point, St. Croix, the US Virgin Islands, and the US West Coast[43]. The most recent recorded observations of hawksbill sea turtles found occurred in in 1957 at an unknown location in Texas[52].

Potential foraging and nesting habitat for the leatherback sea turtle does not exist within the action area or within the 3-mile survey area. Leatherback sea turtles will not occur within the action area for this project.

Potential Effects to Leatherback Sea Turtles

Potential foraging and nesting habitat for the leatherback sea turtle does not exist within the action area or within the 3-mile survey area. Leatherback sea turtles will not occur within the action area for this project.

The leatherback sea turtle will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the leatherback sea turtle.

Determination of Effect

The proposed action will have no effect on the leatherback sea turtle.

8.7.1.6 Loggerhead Sea Turtle

Potential to Occur in the Action Area

Nesting occurs on oceanic beaches between the high tide line and dune fronts and occasionally on estuarine shorelines with suitable sand. Females prefer narrow, steeply sloped, coarse-grained beaches. This turtle is a shallow water benthic feeder with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs[37].

No habitat with the potential to support the loggerhead sea turtle was observed within the Mont Belvieu Complex.

No habitats with the potential to support the loggerhead sea turtle are located within at least 7 miles of the project area. USFWS designated critical habitat is not yet designated for this species[43]. The closest known observations of loggerhead sea turtles found occurred in Galveston Bay (approximately 25 miles south of the project area)[49]. The closest, and most recent, known observations of loggerhead sea turtle nests found occurred on the Bolivar Peninsula in 2008 (approximately 35 miles south of the project area)[51].

Potential foraging and nesting habitat for the loggerhead sea turtle does not exist within the action area or within the 3-mile survey area. Loggerhead sea turtles will not occur within the action area for this project.

Potential Effects to Loggerhead Sea Turtles

Potential foraging and nesting habitat for the loggerhead sea turtle does not exist within the action area or within the 3-mile survey area. Loggerhead sea turtles will not occur within the action area for this project.

The loggerhead sea turtle will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the loggerhead sea turtle.

Determination of Effect

The proposed action will have no effect on the loggerhead sea turtle.

8.7.1.7 Smalltooth Sawfish

Potential to Occur in the Action Area

Preferred habitat includes shallow coastal seas and estuaries with muddy and sandy bottoms. They are typically found close to shore, in sheltered bays and on shallow banks[35].

No habitat with the potential to support the smalltooth sawfish was observed within the Mont Belvieu Complex.

No habitats with the potential to support the smalltooth sawfish are located within at least 7 miles of the project area. USFWS designated critical habitat is not yet designated for this species[43]. No known observations of smalltooth sawfish in or near Galveston Bay have been found (approximately 25 miles south of the project area).

Potential habitat for the smalltooth sawfish does not exist within the action area or within the 3-mile survey area. Smalltooth sawfish will not occur within the action area for this project.

Potential Effects to Smalltooth Sawfish

Potential habitat for the smalltooth sawfish does not exist within the action area or within the 3-mile survey area. Smalltooth sawfish will not occur within the action area for this project.

The smalltooth sawfish will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the smalltooth sawfish.

Determination of Effect

The proposed action will have no effect on the smalltooth sawfish.

8.7.1.8 Louisiana Black Bear

Potential to Occur in the Action Area

Louisiana black bears typically inhabit bottomland hardwood forests. Other habitat types the Louisiana black bear utilizes include brackish and freshwater marshes, salt domes, and agricultural fields. These bears require large, remote tracts of land with minimal human disturbance[41].

No habitat with the potential to support the Louisiana black bear was observed within the Mont Belvieu Complex.

Although some characteristics of the mixed woodlands habitat type meet the qualifications for LBB habitat, these woodlands are not large enough, not continuous, and are frequently subject to human disturbance. These woodlands would not likely support LBB. The USFWS designated critical habitat for the Louisiana black bear is located in fifteen counties in Louisiana[43]. No known observations of the Louisiana black bear in or near the project area have been found.

Potential habitat for the Louisiana black bear does not exist within the action area or within the 3-mile survey area. Louisiana black bear will not occur within the action area for this project.

Potential Effects to Louisiana Black Bears

Potential habitat for the Louisiana black bear does not exist within the action area or within the 3-mile survey area. Louisiana black bears will not occur within the action area for this project.

The Louisiana black bear will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the Louisiana black bear.

Determination of Effect

The proposed action will have no effect on the Louisiana black bear.

8.7.1.9 Sprague's Pipit

Potential to Occur in the Action Area

Sprague's pipits are migratory birds and their breeding habitat is known to be the northern US and Canada. Therefore, the consideration of potential nesting habitat was excluded from this analysis. Potential habitat within the action area would be limited to wintering habitat (foraging and roosting). Preferred foraging habitat includes undisturbed midgrasslands with intermediate thickness[34].

No habitat with the potential to support the Sprague's pipit was observed within the Mont Belvieu Complex. The pastureland within the project area is consistently maintained and disturbed by industrial activity.

Sprague's pipits are known to prefer undisturbed grasslands. No undisturbed grasslands were identified within at least 3 miles of the action area. USFWS designated critical habitat is not yet designated for this species[43]. The closest recorded observations of Sprague's pipit found occurred in the Anahuac National Wildlife Refuge (approximately 28 miles southeast of the action area)[53].

Potential foraging and roosting habitat for the Sprague's pipit does not exist within the action area or within the 3-mile survey area. Sprague's pipits are not known to occur, and are unlikely to occur, within the action area for this project.

Potential Effects to Sprague's Pipits

Potential foraging and roosting habitat for the Sprague's pipit does not exist within the action area or within the 3-mile survey area. Sprague's pipits are not known to occur, and are unlikely to occur, within the action area for this project.

The Sprague's pipit will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the Sprague's pipit.

Determination of Effect

The proposed action will have no effect on the Sprague's pipit.

8.7.1.10 Red Wolf

Potential to Occur in the Action Area

Red wolves are a very rare species in the wild. Only one known population exists in the wild and is located in North Carolina[42]. Little information is available describing red wolf habitat characteristics.

Habitat with the potential to support the red wolf was not observed within the Mont Belvieu Complex.

Red wolves are known to be limited in the wild to select locations in North Carolina[42]. No known observations of the red wolf in or near the project area have been found.

Potential habitat for the red wolf does not exist within the action area or within the 3-mile survey area. Red wolves are not known to occur, and are unlikely to occur, within the action area for this project.

Potential Effects to Red Wolves

Potential habitat for the red wolf does not exist within the action area or within the 3-mile survey area. Red wolves are not known to occur, and are unlikely to occur, within the action area for this project.

The red wolf will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact the red wolf.

Determination of Effect

The proposed action will have no effect on the red wolf.

8.7.2 MIGRATORY BIRDS

Potential to Occur in the Action Area

The maintained pastureland within the Mont Belvieu Complex has the potential to support migratory birds. However, this area does not offer significant resources and is surrounded by industrial activity. Use of this habitat would be minimal. No nests were observed within the project area.

As described in Section 6.2, a variety of migratory birds have the potential to utilize the habitats surrounding the proposed project area, including the residential areas. A variety of species of migratory birds were observed in select habitats surrounding the project location, including wading birds, raptors, and songbirds. The habitats surrounding the facility range in quality from low to moderate and have historically been subject to agricultural and industrial activities.

Select migratory birds are likely to occur in all observed habitats surrounding the proposed project area, excluding existing industrial facilities. The frequency of occurrence and species of migratory birds in each habitat is dependent upon habitat characteristics and quality.

Potential Effects to Migratory Birds

Low quality habitat with minimal potential to support migratory birds was observed within the Mont Belvieu Complex. A variety of migratory birds have the potential to and currently do utilize the habitats surrounding the proposed project area, excluding existing industrial facilities.

Migratory birds will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact migratory birds.

Determination of Effect

The take of migratory birds is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Migratory Bird Treaty Act described above in Section 3.3.

8.7.3 BALD AND GOLDEN EAGLES

Potential to Occur in the Action Area

No habitat with the potential to support bald or golden eagles was observed within the Mont Belvieu Complex.

Select areas surrounding the project area are potential feeding habitats for bald or golden eagles. Select wooded areas are potential nesting habitats for bald eagles. However, these wooded areas would be considered low quality nesting sites. The areas surrounding the project site are impacted by agricultural and industrial development.

No bald or golden eagles or eagle nests were observed during the windshield or aerial survey of the 3-mile radius around the project area.

No sources have been found to indicate bald or golden eagles have been observed near the proposed project area. No occurrences of bald or golden eagles have been recorded within at least 8 miles of the project site[44]. Bald or golden eagles are unlikely to occur within the action area for this project.

Potential Effects to Bald and Golden Eagles

The potential exists for bald eagles to utilize the select habitats surrounding the Mont Belvieu Complex. However, no bald or golden eagles or eagle nests were observed during the aerial survey and no occurrences of bald or golden eagles have been recorded within at least 8 miles of the project site[44].

Bald or golden eagles will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact these eagles.

Determination of Effect

The take of bald or golden eagles is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Bald and Golden Eagle Protection Act described above in Section 3.4.

8.7.4 MARINE MAMMALS

Potential to Occur in the Action Area

Marine mammals are ecologically restricted to marine or estuarine habitats.

No habitats with the potential to support marine mammals are located within at least 10 miles of the project area.

Potential marine mammal habitat does not exist within the action area or within the 3-mile survey area. Marine mammals will not occur within the action area for this project.

Potential Effects to Marine Mammals

Potential marine mammal habitat does not exist within the action area or within the 3-mile survey area. Marine mammals will not occur within the action area for this project.

Marine mammals will not be directly impacted by construction activities associated with the completion of the Frac facilities project, noise pollution, or human disturbance. All wastewater associated with construction and operation of the Frac facilities project will be treated onsite and will not impact marine mammals.

Determination of Effect

The take of marine mammals is not anticipated as a result of this project.

Note: The term "take" represents the more specific language of the Marine Mammal Protection Act described above in Section 3.5.

9.0 CONCLUSIONS

This section is a summary of WGI's recommended determination of effect for all federally-protected species, a description of any interdependent and interrelated actions, and a description of any anticipated cumulative effects resulting from the proposed project.

9.1 DETERMINATION OF EFFECT

The recommended determinations of effect for all federally-protected species with the potential to occur within habitat located within the action area (maximum radius of approximately 0.5 mile) are summarized below in Table 10.

Table 10. Determination of Effect Summary

Federally Protected Species	Determination of Effect
Piping Plover	No Effect
Green Sea Turtle	No Effect
Hawksbill Sea Turtle	No Effect
Kemp's Ridley Sea Turtle	No Effect
Leatherback Sea Turtle	No Effect
Loggerhead Sea Turtle	No Effect
Smalltooth Sawfish	No Effect
Sprague's Pipit	No Effect
Louisiana Black Bear	No Effect
Red Wolf	No Effect

As described in Section 8.7, the take of migratory birds, Bald or golden eagles, or marine mammals is not anticipated as a result of this project.

9.2 INTERDEPENDENT AND INTERRELATED ACTIONS

The proposed project includes the construction of two Frac units and one DIB unit as outlined in Section 4.0. No additional interdependent or interrelated actions are proposed at this time.

9.3 CUMULATIVE EFFECTS

The project site is located within an industrial area. Multiple industrial facilities have historically been and continue to be operational within Mont Belvieu and Chambers County, Texas. The area is likely to experience additional industrial development over time.

Any new proposed developments may have the potential to impact federally-protected species. However, WGI is not aware of any specific projects planned for this area at this time.

No additional actions with the potential to impact federally-protected species are planned for the Mont Belvieu Complex at this time.

9.4 CONSERVATION MEASURES

The construction of the proposed project will likely have no direct or indirect impact on federally-protected species habitat.

Enterprise plans to utilize the BACT to control the project emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. The proposed emissions of each pollutant subject to PSD review are consistent with both the TCEQ BACT guidance and the most stringent limit in the RBLC; and, are considered to be the top level of control available for the new facilities.

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11.0 LIST OF PREPARERS

Jayme A. Shiner, Ecologist	PWS, B.S. General Biology
Scott W. Jecker, Senior Scientist	CWB, PWS, M.S. Wildlife Biology
Cimagaroon Howell	B.S. Microbiology

APPENDIX A

FLOW DIAGRAMS

ENTERPRISE MONT BELVIEU
FRACTIONATORS A/B
BLOCK FLOW DIAGRAM
FOR PERMITTING PURPOSES
DECEMBER, 2011
FIGURE 4-1

FEED TREATING

LEAN AMINE TANK
SV19.003A/B

AMINE TANK
SV19.002A/B

AMINE REGENERATION SYSTEM

LEAN AMINE

RICH AMINE

A

PIPELINE FEED

Y-GRADE

FEED COALESCER

Waste Water

1st STG. AMINE COALESCER

2nd STG. AMINE COALESCER

DEHYDRATION / DEHYDRATOR REGENERATION

REGENERANT COALESCER

REGENERANT COOLER

FEED DEHYDRATORS

REGENERANT HEATER
HR15.002A/B

REGENERANT INTERCHANGER

HOT OIL SYSTEM

HOT OIL RETURN (HOR)

HOT OIL SURGE DRUM

HOT OIL HEATER
HR15.001A/B

HOT OIL SUPPLY (HOS)

C

PROPYLENE REFRIGERATION

ETHANE PRODUCT

H_2O

DEETHANIZER CONDENSER

REFRIGERANT ECONOMIZER

REFRIGERANT SUBCOOLER

REFRIGERANT ACCUMULATOR

REFRIGERANT CONDENSER (WSAC)
HT16.028A/B

REFRIG. COMPRESSOR

REFRIG. COMP. SUCTION KO DRUM

FUGITIVES
A/B

RAINWATER FROM SUMPS

H, I

WASTEWATER TANK
SV19.006A/B

WASTEWATER

E

FUEL GAS SUPPLY

FUEL GAS KO DRUM

B

DEETHANIZER REFLUX ACCUMULATOR

H_2O

REFLUX COOLER (WSAC)
HT16.029A/B

DEPROPANIZER HEAT PUMP COMPRESSOR

DEPROPANIZER COMPRESSOR SUCTION KO DRUM

DEBUTANIZER REFLUX ACCUMULATOR

H_2O

MIXED BUTANE PRODUCT

REFLUX COOLER (WSAC)
HT16.029A/B

DEETHANIZER

DEPROPANIZER

DEBUTANIZER

PROPANE PRODUCT

D

DEETHANIZER UPPER SIDE REBOILER

DEETHANIZER COLD PROPANE REBOILER

DEPROPANIZER SIDE REBOILER

HOS

HOR

DEPROPANIZER REBOILER

HOS

HOR

DEBUTANIZER REBOILER

H_2O

UNTREATED GASOLINE PRODUCT

REFLUX COOLER (WSAC)
HT16.029A/B

F

PROCESS FLARE SK.25.001

AIR ASSIST

PLANT FLARE HEADER

FLARE SYSTEM

HOS

HOR

DEETHANIZER REBOILER (HOT OIL)

DEETHANIZER REBOILER (HOT PROPANE)

PROCESS H_2O

CLARIFIER

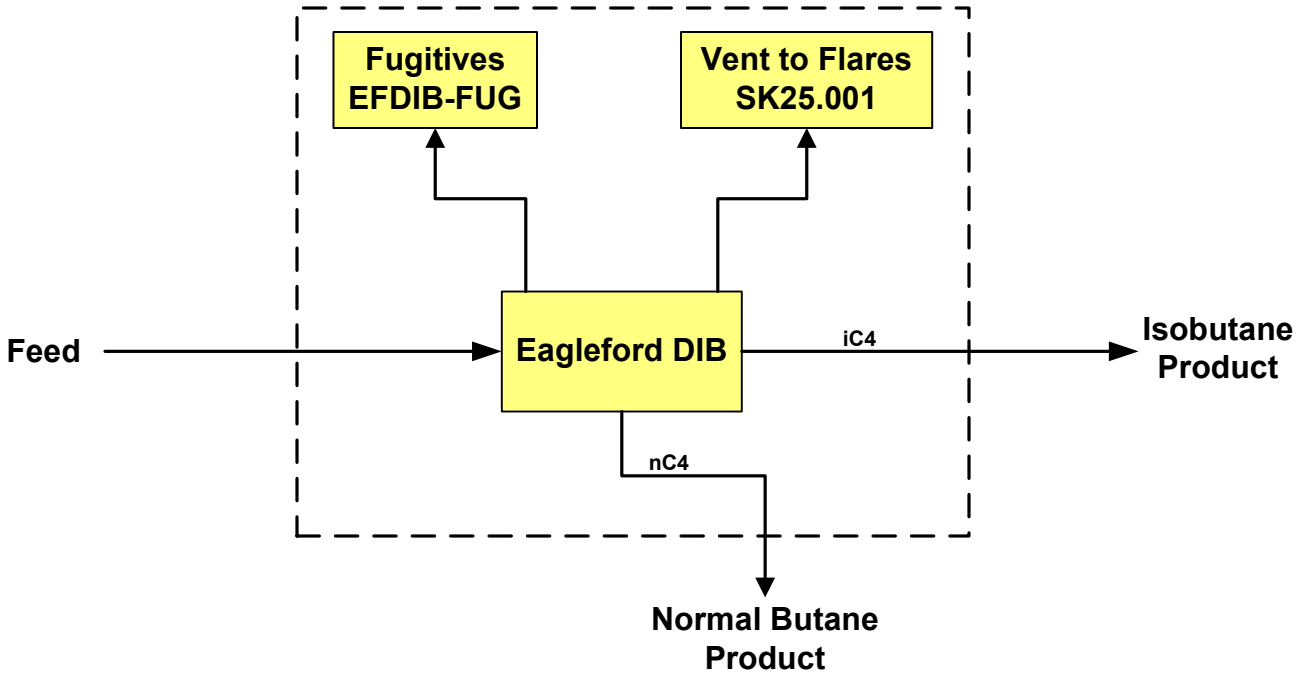
RAW H_2O (CIWA CANAL)

SLUDGE CENTRIFUGE

SLUDGE

G

RAW WATER TREATMENT



Enterprise Products Operating LLC
Mont Belvieu Complex

Figure 4-2
Process Flow Diagram

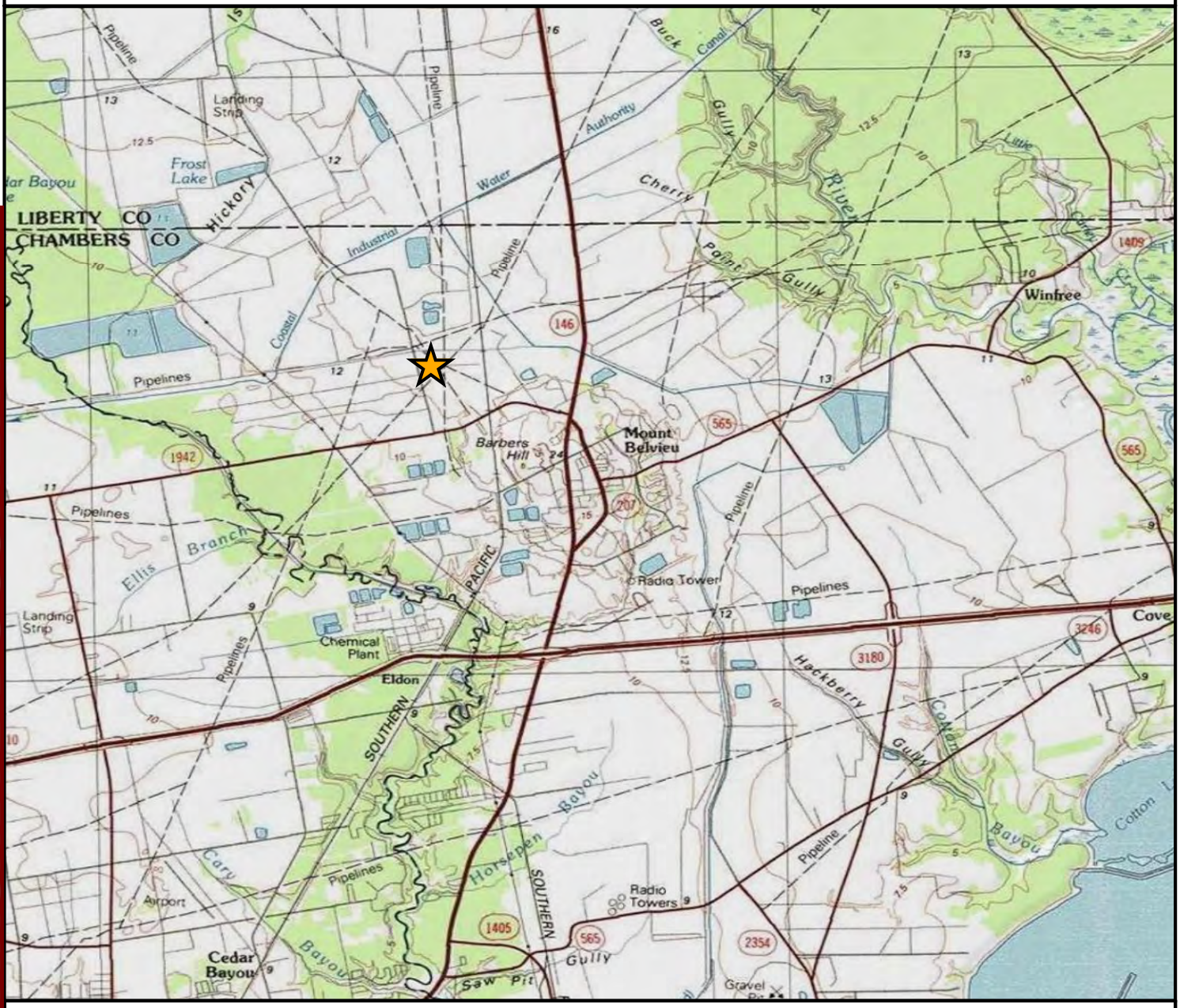
RPS

14450 JFK Boulevard, Suite 400,
Houston, Texas, 77032.

APPENDIX B

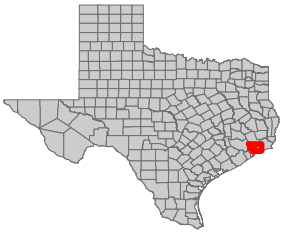
FIGURES

Figure 1
Project Location
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas



Chambers County

Project Location



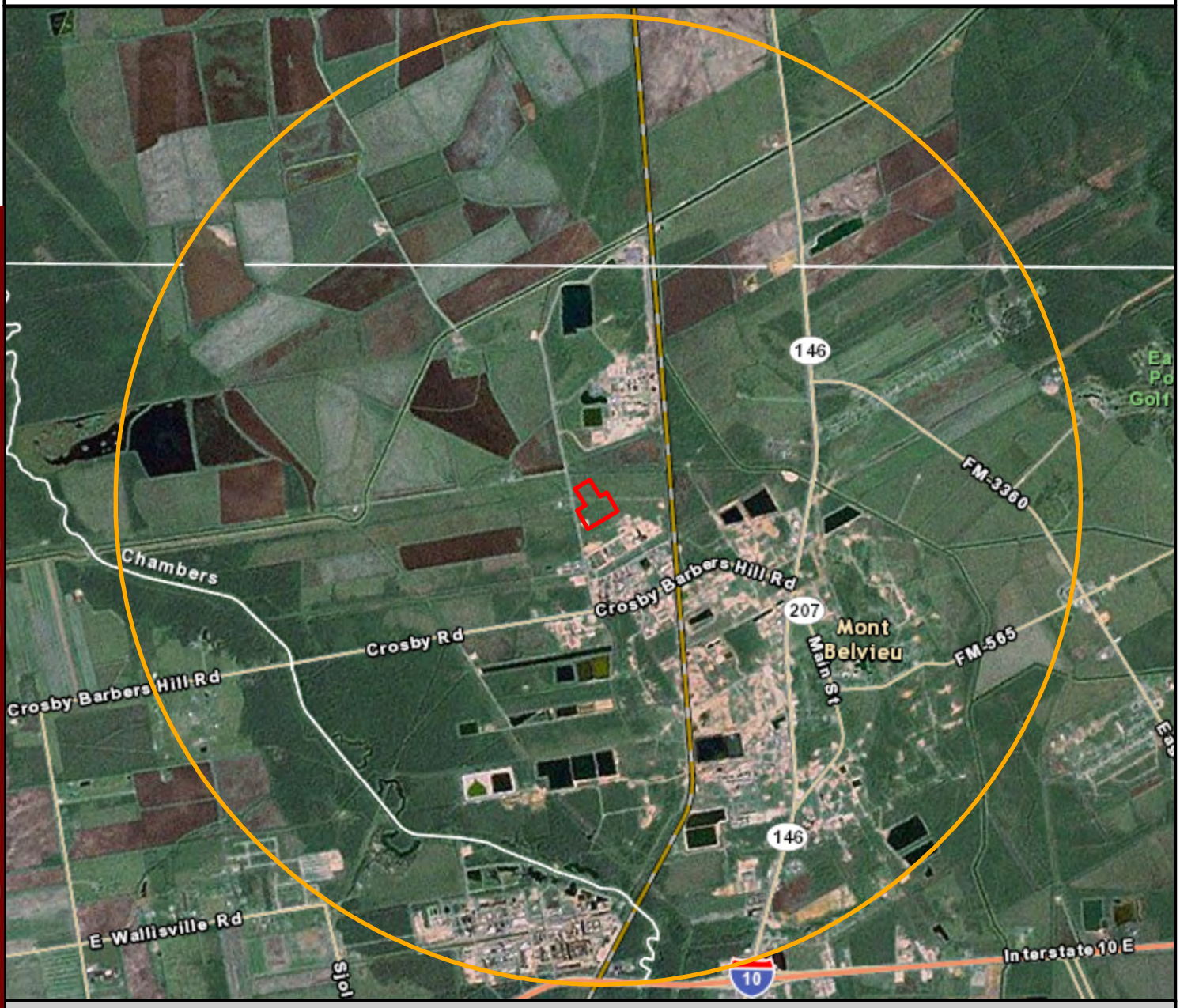
Background Resources: USGS 100K DRG Esri USA Topo Basemap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 05/06/2012 by Jayme Shiner		0 5,000 10,000 Feet N

Figure 2
Construction Area
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas

Construction Area
(~30 Acres)

Background Resources: USGS 1 Meter DOQQ (2010) Mont Belvieu (NE) ESRI Streetmap Basemap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 5/25/2012 by Jayme Shiner		0 125 250 500 Feet

Figure 3
Survey Area - 2010 Aerial Photograph
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas



Construction Area (~30 Acres)

Survey Area (3 Mile Radius)

Background Resources: USGS 1 Meter DOQQ (2010) Mont Belvieu (NE), Sheeks (SE) Moss Bluff (SW), Cove (NW) ESRI Transportation Basemap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 5/25/2012 by Jayme Shiner		0 2,500 5,000 Feet

Figure 4
Survey Area - Topographic Map
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas

Construction Area (~30 Acres)

Survey Area (3 Mile Radius)

Background Resources: USGS 24K DRG Mont Belvieu, Sheeks Moss Bluff, Cove ESRI Transportation Basemap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 5/25/2012 by Jayme Shiner		0 2,500 5,000 Feet

Figure 5
FEMA Floodplain and National Wetland Inventory Data
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas

Construction Area (~30 Acres)

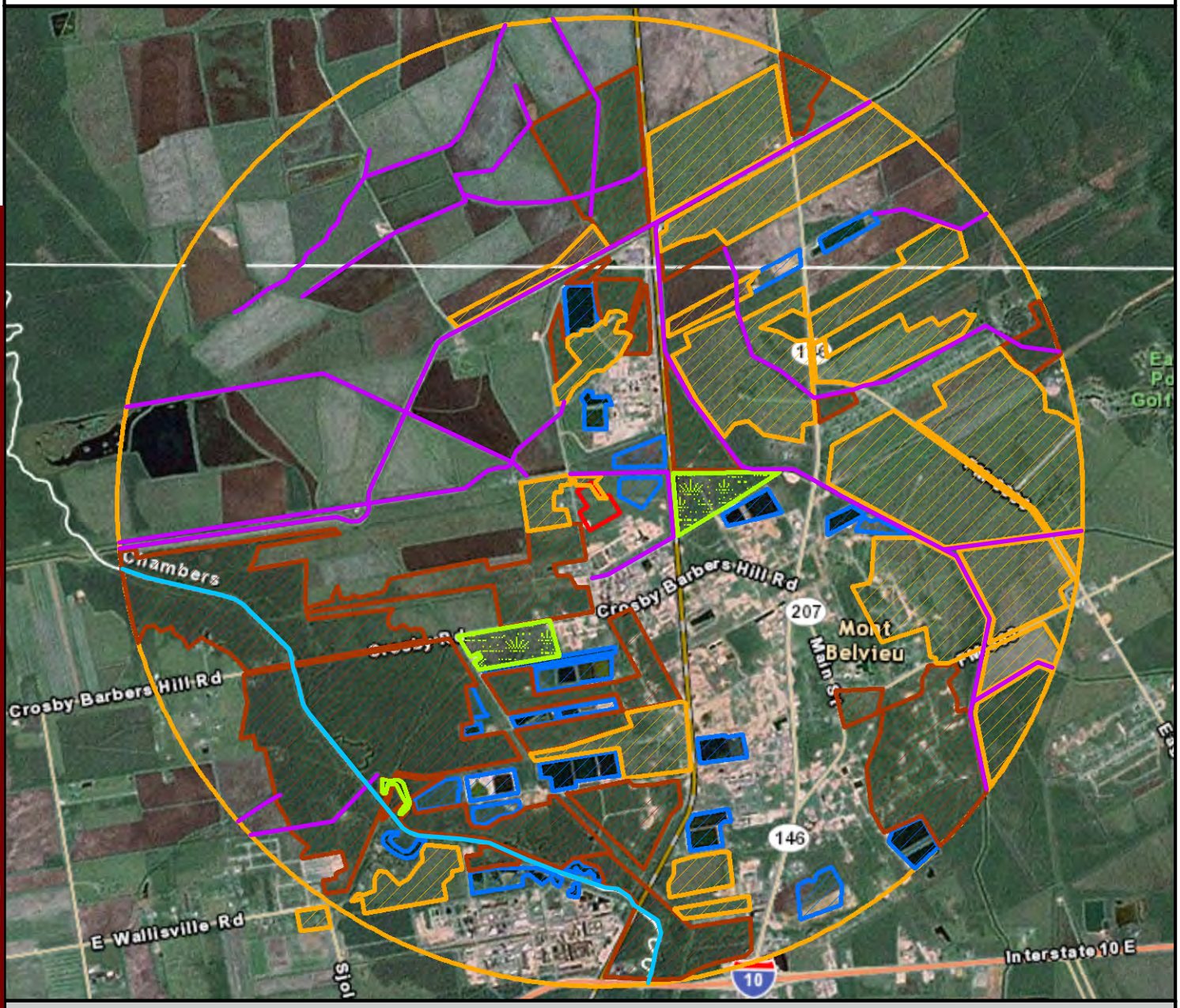
Survey Area (3 Mile Radius)

FEMA Floodplain Data

USFWS NWI Data

Background Resources: USGS 1 Meter DOQQ ESRI Transportation Basemap FEMA Floodplain Data USFWS NWI Data	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 5/25/2012 by Jayme Shiner		0 2,500 5,000 Feet

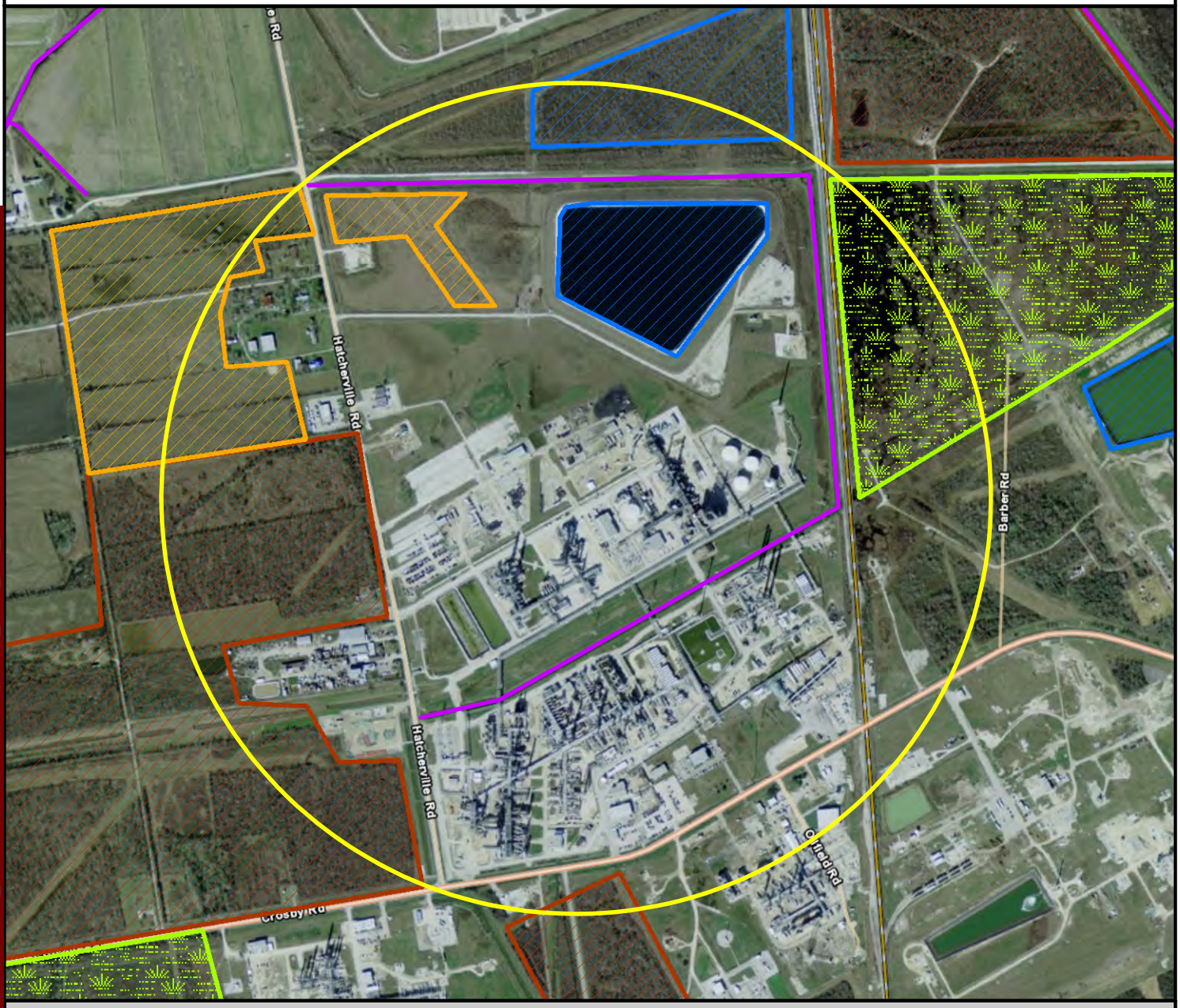
Figure 6
Observed Habitats
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas



- Construction Area (~30 Acres)
- Survey Area (3 Mile Radius)
- Riverine Habitat
- Canal Habitat
- Pastureland Habitat
- Woodland Habitat
- Open Water Habitat
- Wetland Habitat

Background Resources: USGS 1 Meter DOQQ ESRI Transportation Basemap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1234 Mont Belvieu Eagleford Fractionation and Deisobutanizer Biological Assessment	Whitenton Group, Inc. ENVIRONMENTAL CONSULTANTS 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 5/25/2012 by Jayme Shiner		0 2,500 5,000 Feet

Figure 7
Action Area
Mont Belvieu Eagleford Fractionation and Deisobutanizer Project
Chambers County, Texas



Action Area (0.50 Mile Radius)

Pastureland Habitat

Canal Habitat

Open Water Habitat

Woodland Habitat

Wetland Habitat

Background Resources:
USGS 1 Meter DOQQ
ESRI Transportation Basemap

Surveyor(s):
Jayme Shiner PWS
Bryan Whisenant

Project Number and Information:
1234
Mont Belvieu Eagleford
Fractionation and Deisobutanizer
Biological Assessment

GPS and Coordinate Type:
Trimble Geo XH 6000 Series
UTM NAD 1983
Zone 15 North

Map Created:
5/25/2012 by Jayme Shiner

Whitenton Group, Inc.
ENVIRONMENTAL CONSULTANTS
3413 Hunter Road San Marcos Texas 78666

0 750 1,500 Feet

APPENDIX C

PHOTOGRAPHS

Whitenton Group, Inc.
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG **1**

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northwest view of the pastureland within the proposed project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the flare and pit within the proposed project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the proposed project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Southeast view of the staging area within the proposed project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the staging area within the proposed project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of Fractionator VI currently under construction.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the canal immediately north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the wetland habitat southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

01/16/2012

Chambers County, Texas

View: Northeast view of a wetland complex southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

11/01/2012

Chambers County, Texas

View: East view Cedar Bayou (riverine habitat) southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: North view of Cedar Bayou (riverine habitat) southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

11/01/2012

Chambers County, Texas

View: East view of a Cedar Bayou oxbow (open water/wetland habitat) southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of the open water habitat (man-made pond) northeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Southeast view of the open water habitat (retention pond) north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northeast view of the canal habitat (irrigation canal) north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of the pastureland (maintained) southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the pastureland (maintained) habitat northeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of the pastureland and woodland habitats north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the woodland habitat southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of an agriculture field north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of an agriculture field north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of an industrial area southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

01/16/2012

Chambers County, Texas

View: West view of an industrial area southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the open water and woodland habitats south of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the open water and woodland habitats south of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of the pastureland and woodland habitats east of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: West view of the pastureland habitat an industrial areas east of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northwest view of the pastureland and woodland habitats southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northwest view of the woodland habitat and industrial areas southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northwest view of the industrial areas southeast of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: North view of the pastureland habitat and industrial areas south of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: North view of the woodland habitat and industrial areas south of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Northeast view of the pastureland habitat and industrial areas southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: North view of the pastureland and woodland habitats southwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: East view of the woodland habitat west of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Southeast view of the woodland and canal habitats and agriculture fields northwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Southeast view of agriculture fields northwest of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: Southeast view of the agriculture field north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the woodland and pastureland habitats north of the project area.

Mont Belvieu Eagleford Fractionation and Deisobutanizer Project

05/01/2012

Chambers County, Texas

View: South view of the agriculture fields north of the project area.

APPENDIX D

FIELD SURVEY DATA SUMMARY

Whitenton Group, Inc.
ENVIRONMENTAL CONSULTANTS

1 May 2012

Weather: high 80s, humid, sunny, partly cloudy, <5 mph wind

Surveyors: Jayme Shiner PWS, Bryan Whisenant

Site inspection at Frac facility (Mont Belvieu Complex) in Mont Belvieu, TX.

Surveyed proposed project area. Adjacent to 3 existing Frac facilities (two operational and one under construction). Northwest corner of site is maintained pastureland (previously disturbed). Vegetation: *Cynodon dactylon*. Northeast corner of site is existing flare and pit. South two thirds of the site is a staging area for Frac VI. Staging area consists of road base, temporary buildings, vehicles, and other equipment. Surveyed all areas safely accessible. Majority of facility is concrete, caliche, or industrial development. Drainage canal on the north boundary of the project area ultimately leads to Cedar Bayou. No wildlife was observed.

Survey continued outside the boundaries of the Frac facility. Surveyed all publicly accessible, terrestrial areas within a 3-mile radius.

Headed north on Hatcherville Road. Observed pastureland, woodland, agriculture fields, canals, and open waters.

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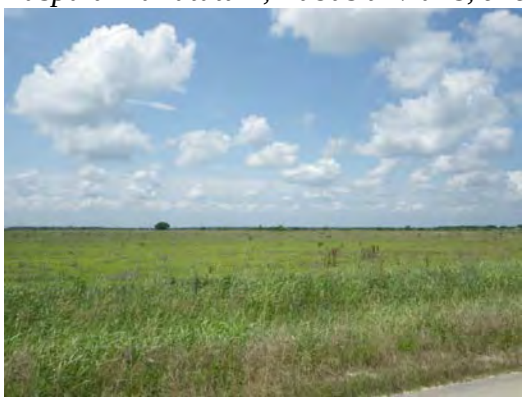
www.whitentongroup.com

Open Water (man-made pond). Vegetation: *Cynodon dactylon, Cyperus entrerianus, and Stenotaphrum secundatum.* Photos taken.

Maintained pastureland. Vegetation: *Cynodon dactylon*, *Verbena brasiliensis*, *Paspalum dilatatum*, *Rubus trivialis*, and *Coreopsis basalis*. Photos taken.



Mixed woodlands. Primarily small, fragmented tracts. Vegetation: *Triadica sebifera, Quercus phellos, Pinus taeda, Celtis laevigata, Melia azedarach, Quercus falcata, Campsis radicans, Ligustrum sinense, Sabal minor,* and *Smilax rotundifolia*. Photos taken.

Canals. Man-made drainage and flood control canals. Vegetation: *Cynodon dactylon, Cyperus entrerianus, and Stenotaphrum secundatum.* Photos taken.

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www.whitentongroup.com

Agriculture fields observed (rice fields, other crop fields). Photos taken.

Hatcherville Road to FM 1942 to the west. Observed woodlands, wetland complexes, and Cedar Bayou.

Cedar Bayou photos taken.

Woodland. Vegetation: *Triadica sebifera*, *Quercus phellos*, *Pinus taeda*, *Celtis laevigata*, *Melia azedarach*, *Quercus falcata*, *Campsis radicans*, *Ligustrum sinense*, *Sabal minor*, and *Smilax rotundifolia*. Some areas dominated by *Quercus phellos* or *Pinus taeda*. Photos taken.

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Wetland complex observed south of FM 1942. Vegetation: *Fraxinus pennsylvanica*, *Juncus effusus*), *Saccharum giganteum*, *Triadica sebifera*, *Baccharis halimifolia*, *Typha latifolia*, and *Panicum repens*. Photos taken during recent previous survey for a separate project. Cedar Bayou oxbow also observed during same survey.

Headed back east on FM 1942. Observed industrial areas. Headed north on Highway 146. Observed industrial areas, pastureland, fragmented woodlands, canals, and open waters.

Industrial areas. Photos taken.

Pastureland. Vegetation: *Cynodon dactylon*, *Verbena brasiliensis*, *Paspalum dilatatum*, *Rubus trivialis*, and *Coreopsis basalis*. Photos taken.

Fragmented woodlands. Vegetation: *Triadica sebifera*, *Quercus phellos*, *Pinus*

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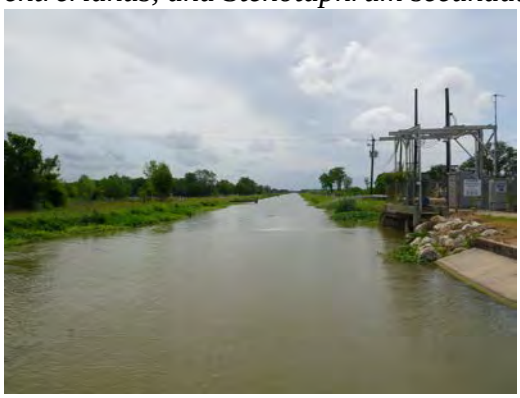
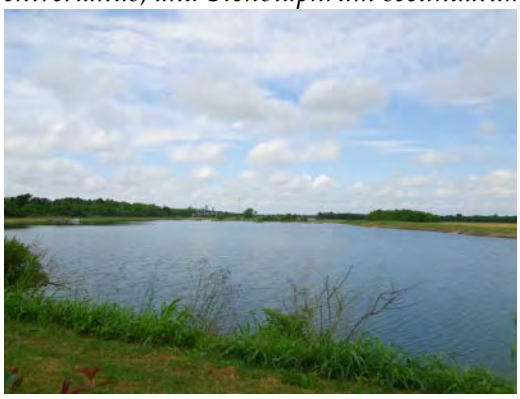
taeda, Celtis laevigata, Melia azedarach, Quercus falcata, Campsis radicans, Ligustrum sinense, Sabal minor, and *Smilax rotundifolia*. Photos taken.


Canals (man-made irrigation canals). Vegetation: *Cynodon dactylon, Cyperus entrerianus, and Stenotaphrum secundatum.* Photos taken.



Open waters (man-made ponds). Vegetation: *Cynodon dactylon, Cyperus entrerianus, and Stenotaphrum secundatum.* Photos taken.



Headed back south down Highway 146. Mostly industrial areas observed. Few fragmented maintained pasturelands observed. Vegetation: *Cynodon dactylon*, *Verbena brasiliensis, Paspalum dilatatum, Rubus trivialis*, and *Coreopsis basalis*. Photos taken.

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Headed north on Highway 207. Mostly industrial areas observed. Few fragmented woodlands and residential areas observed. Vegetation: *Triadica sebifera*, *Quercus phellos*, *Pinus taeda*, *Celtis laevigata*, *Melia azedarach*, *Quercus falcata*, *Campsis radicans*, *Ligustrum sinense*, *Sabal minor*, and *Smilax rotundifolia*. Photos taken.

Headed east on FM 565. Few residential areas, few fragmented woodlands observed. Vegetation: *Triadica sebifera*, *Quercus phellos*, *Pinus taeda*, *Celtis laevigata*, *Melia azedarach*, *Quercus falcata*, *Campsis radicans*, *Ligustrum sinense*, *Sabal minor*, and *Smilax rotundifolia*. Photos taken.

Headed back to airport to begin aerial survey.

Flew in from the southwest at a safe altitude, but low enough to observe features

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and potential bald or golden eagle individuals or nests. Circled clockwise twice (one inner loop, one outer loop). Revisited wooded areas as needed. Observed habitat types, new development not on recent aerial or satellite imagery, and land use not visible from public roadways. No bald or golden eagles or nests were observed. Wading birds and small raptors were observed. Photos taken. A sample of photos included below.

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